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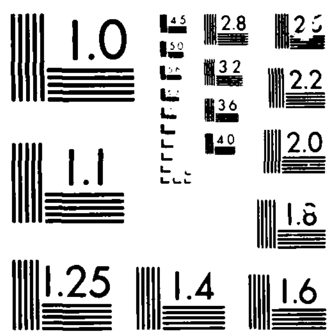


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# NAVAL POSTGRADUATE SCHOOL

## Monterey, California



Monthly and Seasonal Climatology of the Northern Winter over the Global Tropics and Subtropics for the Period 1974 to 1983

Volume IV. 700 mb Winds

by

James S. Boyle and C.-P. Chang

May 1986

Technical Report May 1985 - May 1986

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Washington, D.C. 20233

NAVAL POSTGRADUATE SCHOOL
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20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

This atlas of the 700 mb circulation field contains northern winter monthly and seasonal mean wind analyses, velocity potential and streamfunction from 40°S to 60°N over a global belt for the period 1974 through 1983. In addition, the deviations of the individual annual seasonal and monthly means from their respective nine-year means are presented for the same variables. The basic wind data used are the operational Global Band Analyses of the United States Navy's Fleet Numerical Oceanography Center.

*CONTENTS*

*ABSTRACT*

This atlas of the 700 mb circulation field contains northern winter monthly and seasonal mean wind analyses, velocity potential and streamfunction from 40°S to 60°N over a global belt for the period 1974 through 1983. In addition the deviations of the individual annual seasonal and monthly means from their respective nine-year means are presented for the same variables. The basic wind data used are the operational Global Band Analyses of the United States Navy's Fleet Numerical Oceanography Center.

## *1. INTRODUCTION*

This atlas depicts the wintertime (December, January, February) seasonal and monthly mean atmospheric 700 mb motion fields for the period 1974/1975 to 1982/1983. The charts display 700 mb streamfunction, wind vectors, isotachs, and velocity potential from $40^{o}S$ to $60^{o}N$. In addition to the nine-year seasonal and monthly means and the individual annual seasonal and monthly averages, the deviations of the individual seasonal and monthly means from their nine-year averages are also presented. The seasonal calculations are based on the months of December, January, and February. The data used as the basis for these motion fields are the Global Band Analysis (GBA) of the United States Navy's Fleet Numerical Oceanography Center (FNOC). The procedure used in producing these analyses are described in section 2.

The motion fields for the winters from 1974/75 to 1982/83 are of interest since the data cover a period not previously examined in other collections of data. Other works such as Oort (1983) and Krishnamurti et. al. (1983) have presented detailed analysis of the decade prior to 1974. The 1974 - 1983 period contains two El Nino/Southern Oscillation (ENSO) events, one occurring in 1976/77 and the other in 1982/83. The latter event is the most intense ENSO event yet observed. Also, the analyses presented here allow the FGGE winter to be placed in a longer term perspective since the FGGE experiment took place in the midst of the period.

## 2. DATA SOURCES, ANALYSIS AND COMPUTATIONAL PROCEDURES

### 2.1 GLOBAL BAND ANALYSIS

The wind data set used in this work are the operational analyses of the Global Band Analyses of FNOC. These data are produced four times daily by objective procedures on a mercator grid which extends from $40^{o}$S to $60^{o}$N. The use of the mercator secant projection results in a change in the actual distance between grid points from 140 km at $60^{o}$N to a maximum value of 280 km at the equator. The objective scheme is designed to take advantage of all the reports in the operational data base, surface synoptic, aircraft, pilot ballons, rawindsonde and satellite data.

The analysis is performed every six hours for the surface, 700, 400, 250 and 200 mb levels. The first guess field used as input for the objective analysis is the six hour persistence field. The approach is to first interpolate the irregularly spaced data to grid points using a successive corrections technique based on Cressman's (1959) method. The successive corrections method takes several scans through the data reducing the scan radius on each successive scan. Analyses are performed of both wind and temperature by this method. These fields are then adjusted to be consistent with a set of numerical variational analysis (NVA) equations which have incorporated the dynamical constraints of the momentum equations with friction included in the surface layer, (Lewis and Grayson, 1972). Temperature and wind fields are adjusted subject to mutual constraints on the fields. However, the surface and 200 mb wind data serve only as a lower and upper boundary condition for the NVA and are not subject to an adjustment.

## 2.2 *COMPUTATION OF STREAMFUNCTION AND VELOCITY POTENTIAL*

The streamfunction ( $\psi$ ) and velocity potential ( $\chi$ ) were computed from the following equations:

$$\nabla^2\chi = \delta$$

$$\nabla^2\psi = \zeta$$

where:

$\zeta$ is the relative vorticity = $\partial v/\partial y - \partial u/\partial x$ and

$\delta$ is the divergence = $\partial u/\partial x + \partial v/\partial y$. Both $\zeta$ and $\delta$ were computed using centered differences on the GBA mercator grid taking the appropriate map scale factor into account.

Equation (2) was solved using the boundary condition that $\chi = 0$ on the north and south boundaries which are at $60^{o}$N and $40^{o}$S respectively. The method used to compute $\psi$ was essentially the method II of Shukla and Saha (1974). This technique uses the previously computed values of $\chi$ to formulate boundary conditions for $\psi$ .

The depiction of the divergence field appears reasonable away from the boundary. Comparison with the global fields produced by the National Meteorological Center (NMC) for the years since the NMC $\chi$ fields have become available indicate that the effect of the boundary conditions on $\chi$ is not significant between $40^{O}$N and $30^{O}$S. Thus the $\psi$ and $\chi$ fields in the equatorial regions are sufficently removed from the boundaries that we can assume that these values are not unduly affected by the choice of boundary conditions.

In addition the windfield was directly decomposed into its *rotational* and *divergent* components using the method of Endlich (1967). This method does not require any assumption about the boundary conditions. The divergent wind vectors shown in the figures are not computed from $\chi$ but are those computed by the Endlich technique. The excellent agreement between the $\chi$ field and the divergent winds over the entire grid, gives confidence in the accuracy of the computations.

## *3. DISCUSSION*

The winter (DJF) mean nine year data (Figs. A1 - A3) are in reasonable agreement with the data of Newell et. al. (1974) and Oort (1983). The 700 mb wind field field is not a common field in most data collections. The familiar features of all these data compilations are prominent in the present work. The $\chi$ field ( Fig. A3 ) shows a broad band of equatorial convergence, with maxima over South America, Africa and a zonally elongated maxima centered on New Guinea. This pattern is similar to the surface $\chi$

field shown in Boyle and Chang (1986), but the gradients and divergent wind is much weaker at 700 mb. There is a rapid decrease in the gradient of $\chi$ and thus the divergent wind magnitude in going from the surface to 700 mb. The largest values of $\chi$ and divergent wind at 700 mb are found in the Equatorial West Pacific. This is in agreement with the findings of Thompson et. al. (1979), who found that the divergence diminished rapidly with height in the east Atlantic but was nearly as strong at 700 mb as at the surface in the west Pacific. It would appear that two major convective centers, equatorial Africa and South America have their lower level convergence largely restricted to below 700 mb. These features are consistent with the tropical outgoing longwave radiation (OLR) data, Boyle and Lau (1984). However, the South Pacific convergence zone (SPCZ) which is in evidence in the OLR data and the 200 mb $\chi$ field does not appear to be a distinct feature in the 700 mb $\chi$ field.

Figure 1 is a plot of the magnitude of the low level ( surface to 700 mb ) wind shear. In regions where the geostrophic approximation is valid, this is related to the mean low level thermal gradient. Not unexpectedly, the largest values are found along and to the east of the Asian and North American continents. There are also large values across the Northern Africa region. The positioning of the strong baroclinicity in the western ocean basins is consistent with these regions as being considered as source regions for baroclinic waves. In the Southern Hemisphere ( summer ) the strongest gradients tend to be on the west coasts of the continents, evidently related to the very cool waters off these coasts.

Figure II is a time, longitude plot of $\chi$ winter, seasonal anomalies along the Equator. The sense of anomalies is that positive anomaly maxima imply convergence relative to the mean. In contrast to the surface and 200 mb , Boyle and Chang (1986), Boyle and Chang (1984), the 700 mb anomalies do not show large deviations during the 1982/83 ENSO event. Evidently, the major circulation changes are above and below 700 mb leaving this level largely unchanged. Examination of the anomalies do not indicate as good a relationship between the $\chi_{700}$ and the OLR anomalies as exhibited between the $\chi_{200}$ and the OLR anomalies.

Further overviews of the interannual, seasonal variations are provided by Figs. III, IV and V. These are time, longitude plots of the 700 mb wind winter season anomalies along the Equator, $20^{O}$N, and $40^{O}$N, respectively. In Fig. III the 82/83 ENSO event is barely in evidence. As in the $\chi$ field, the 700 mb zonal wind ( Fig. IIIa ) shows almost no sign of the rather dramatic anomalies observed at the surface. The subtropical flow of Fig. IV indicates that the most active region at this level is over the Pacific basin. The midlatitude flow in Fig. V has the largest variations on the eastern sides of the major ocean basins in the zonal wind field. The meridional wind anomalies have a wavelike nature to them east of about $180^{O}$ to about $30^{O}$E.

## *REFERENCES*


Boyle, J. S. and C.-P. Chang, 1984: **Monthly and seasonal climatology over the global tropics and subtropics for the decade 1973 to 1983. Vol. I: 200 mb winds.** Tech. Rep. NPS-63-84-006, Dept. of Meteorology, Naval Postgraduate School, Monterey, CA 93943, 172 pp.

Boyle, J. S. and C.-P. Chang, 1986: **Monthly and seasonal climatology over the global tropics and subtropics for the decade 1973 to 1983. Vol. III: Surface winds.** Tech. Rep. NPS-63-84-006, Dept. of Meteorology, Naval Postgraduate School, Monterey, CA 93943, 172 pp.

Boyle, J. S. and K.-M. Lau, 1984: **Monthly and seasonal climatology over the global tropics and subtropics for the decade 1973 to 1983. Vol. II: Outgoing longwave radiation.** Tech. Rep. NPS-63-84-006, Dept. of Meteorology, Naval Postgraduate School, Monterey, CA 93943, 112 pp.

Cressman, G. P.,1959: An operational objective analysis system. **Mon. Wea. Rev.**, **87**, 367-374.

Endlich, R. M., 1967: An iterative method for altering the kinematic properties of wind fields. **J. Appl. Meteor.**, **6**, 837-844.

Fu, C., J. Fletcher and R. Slutz, 1983: The structure of the Asian monsoon surface wind field over the ocean. **J. Clim. Appl. Met.**, **22**, 1242-1252.

Krishnamurti, T. N., H.-L. Pan, R. Pasch and D. Subrahmanyam, 1983: **Interannual variability of the tropical motion field**. *FSU* Report No. 83-3, *Department of Meteorology*, *Florida* State University, Tallahassee, Florida 32306.

Lewis, J. M. and T. H. Grayson, 1972: The adjustment of surface wind and pressure by Sasaki's variational matching technique. **J. Appl. Meteor.** ,**11**, 586-597.

Newell, R.E., J. W. Kidson, D. G. Vincent and G. J. Boer, 1974; **The General Circulation of the Tropical Atmosphere Vol. 2**. Massachusetts Institute of Technology, Boston, MA 02139, 371pp.

Oort, A. H., 1983: **Global atmospheric circulation statistics, 1958 - 1973**. NOAA Professional Paper 14. U. S. Department of Commerce (available from the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402

Shukla, J. and K. R. Saha, 1974: Computation of non-divergent streamfunction and irrotational velocity potential from the observed winds. **Mon. Wea. Rev.**, **102**, 419-425.

Thompson, R. M., S. W. Payne, E. E. Recker and R. J. Reed, 1979: Structure and properties of synoptic-scale wave disturbances in the intertropical convergence zone of the eastern Atlantic. **J. Atmos. Sci.**, **36**, 53-72.

Wright, P. B., T. P. Mitchell and J. M. Wallace, 1985: **Relationships between surface observations over the global oceans and the southern oscillation**. NOAA Data Report ERL PMEL-12, Pacific Marine Environmental Laboratory, Seattle, Washington, 61pp.

# FIGURES

*FIGURE I*

Nine winter season (1974/75 - 1982/83 ) mean wind shear speed for the layer from the surface to 700 mb. Contour interval for the wind shear magnitude is 2 $ms^{-1}$. The black dots on the plot indicate terrain heights greater or equal to 1500 m, smoothed to the GBA grid.

*FIGURE II*

Time versus longitude plot of winter season anomalies of 700 mb velocity potential averaged from $5^{o}$N to $5^{o}$S about the Equator. The ordinate labels refer to the year of the January of the winter involved. The contour interval is 0.25 x $10^{6}$ $ms^{-2}$ . Dashed lines are negative, solid lines are positive values. The zero contour is supressed.

*FIGURE III*

(a) As in Fig. I except for the zonal wind component. The contour interval is 0.25 $ms^{-1}$ (b) As in (a) except for the meridional wind component.

*FIGURE IV*

As in Fig. II except the reference latitude is $20^{\circ}$N.

*FIGURE V*

As in Fig. II except the reference latitude is $40^{\circ}$N.

*FIGURES A1 - A3*

Nine winter season (1974/75 - 1982/83 ) mean circulation fields at the 700 mb. Variables displayed are wind vectors and isotachs, streamfunction, and velocity potential. Contour interval for the streamfunction is $2.0 \times 10^6\ m^2s^{-1}$, for the velocity potential it is $1.0 \times 10^6\ m^2s^{-1}$, and for the isotachs it is $2.5\ ms^{-1}$. The vector scale is given in the upper right portion of the wind vector isotach plots. The grid intervals of the FNOC Global Band Analysis mercator grid are shown on the left hand side and bottom of each figure. The longitude grid is marked every $30^o$ from the Greenwich meridian on the extreme left and the latitude is marked every $10^o$ from $40^oS$ at the bottom of the figure. The black dots on the wind vector plots indicate terrain heights greater or equal to 1000 m, smoothed to the GBA grid. The contour plots use the convention that negative values are dashed, positive values are solid. Although the sign of the streamfunction and velocity potential has no meaning in itself, this plotting convention allows the principle maxima and minima in these fields to be more readily discerned.

## *FIGURES B1 TO B27*

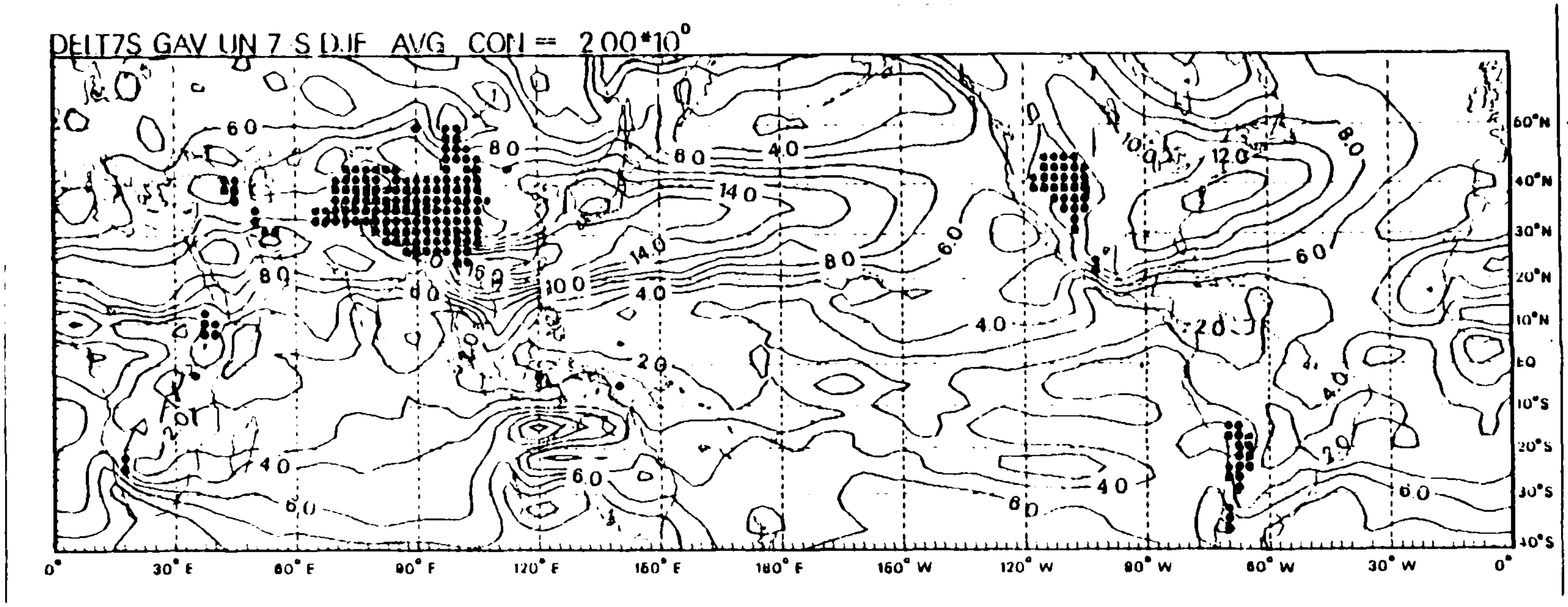
Individual winter season mean and deviation circulation fields at the 700 *mb* for the winters from 1974/75 to 1982/83. The deviations are differences from the nine-year seasonal mean ( Figs. A1 to A3). The figures are labeled with the year corresponding to the year of the January of the winter. Variables displayed are the wind vectors and isotachs, streamfunction, and velocity potential. For the mean fields the contour interval for the streamfunction is 2.0 x $10^6$ $m^2s^{-1}$, for velocity potential it is 1.0 x $10^6$ $m^2s^{-1}$, and for the isotachs it is 2.5 $ms^{-1}$. For the deviation fields the contour interval for the streamfunction is 1.0 x $10^6$ $m^2s^{-1}$, for velocity potential it is 1.0 x $10^6$ $m^2s^{-1}$, and for the isotachs it is 1.5 $ms^{-1}$. On the deviation plots the contours corresponding to negative values are dashed, those corresponding to positive values are solid. The zero contour is not drawn. The vector scale is given in the upper right part of the wind vector plots.

## *FIGURES C1 TO C9*

Nine year (1974 to 1983) monthly mean circulation fields at the 700 mb. The months displayed are December, January, and February. Variables displayed are the wind vectors and isotachs, streamfunction, and velocity potential. The contour interval for the streamfunction is $2.0 \times 10^6\ m^2s^{-1}$, for velocity potential it is $1.0 \times 10^6\ m^2s^{-1}$, and for the isotachs it is $2.5\ ms^{-1}$ The vector scale is given in the upper right part of the wind vector plots.

## *FIGURES D1 TO D81*

Individual monthly mean and deviation circulation fields at the 700 mb for the months from December 1974 to February 1983. The deviations are differences from the nine year monthly mean ( Figs. C1 to C9). The months displayed are December, January, and February. Variables displayed are the wind vectors and isotachs, streamfunction, and velocity potential. For the mean fields the contour interval for the streamfunction is $2.0 \times 10^6\ m^2s^{-1}$, for velocity potential it is $1.0 \times 10^6\ m^2s^{-1}$, and for the isotachs it is $2.5\ ms^{-1}$ For the deviation fields the contour interval for the streamfunction is $1.0 \times 10^6\ m^2s^{-1}$, for velocity potential it is $1.0 \times 10^6\ m^2s^{-1}$, and for the isotachs it is $1.5\ ms^{-1}$. On the deviation plots the contours corresponding to negative values are dashed, those corresponding to positive values are solid. The zero contour is not drawn on the deviations. The vector scale is given in the upper right part of the wind vector plots.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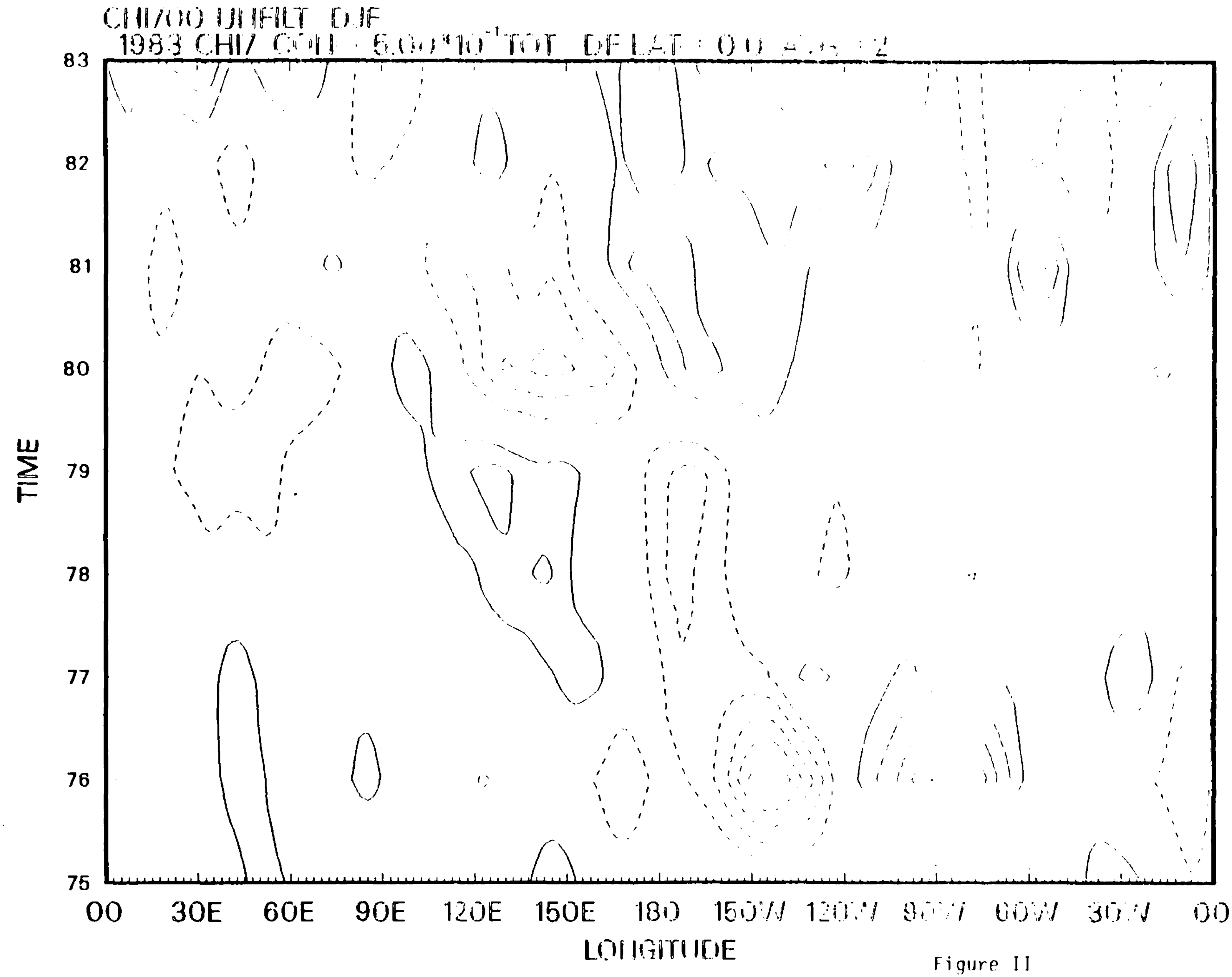
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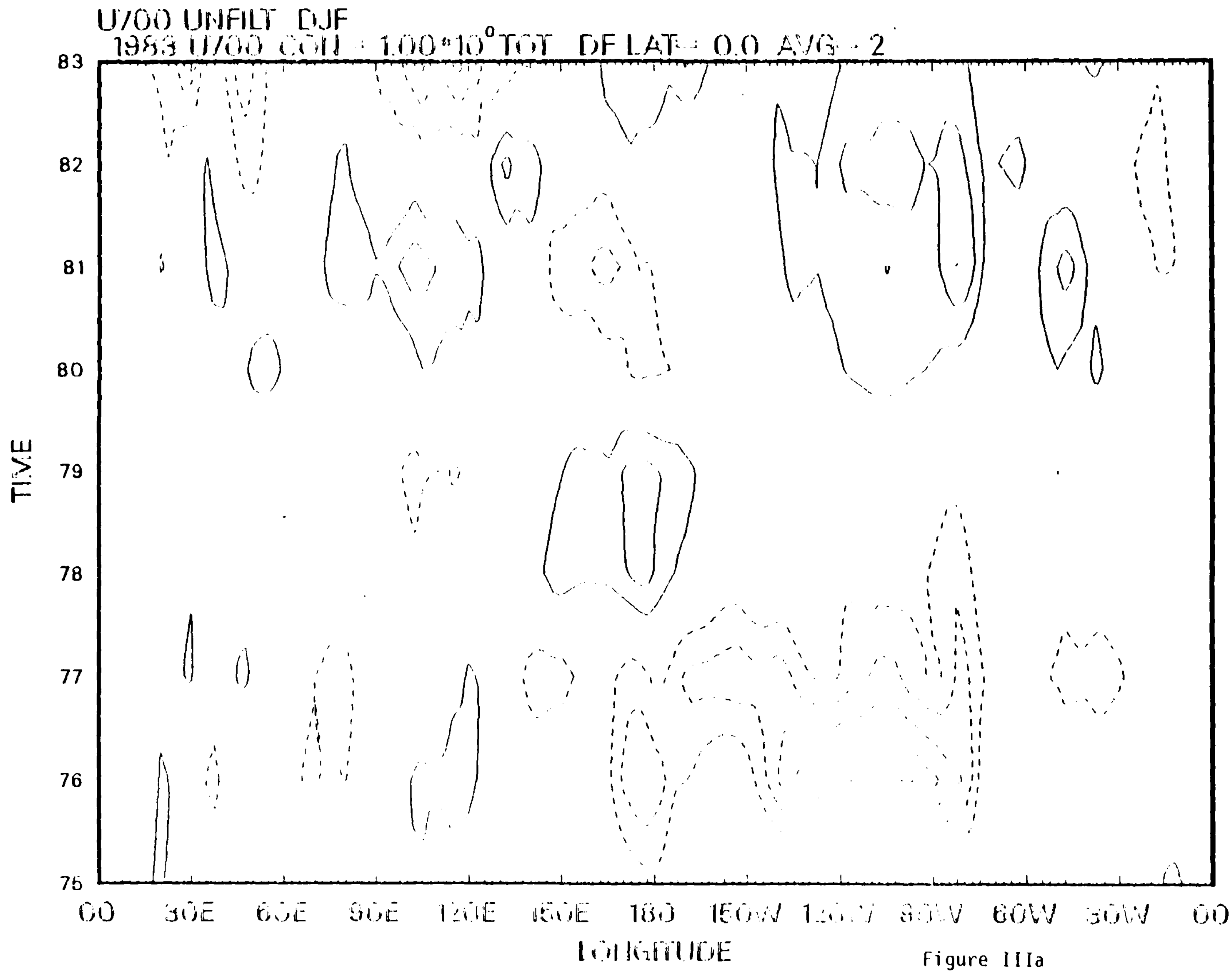
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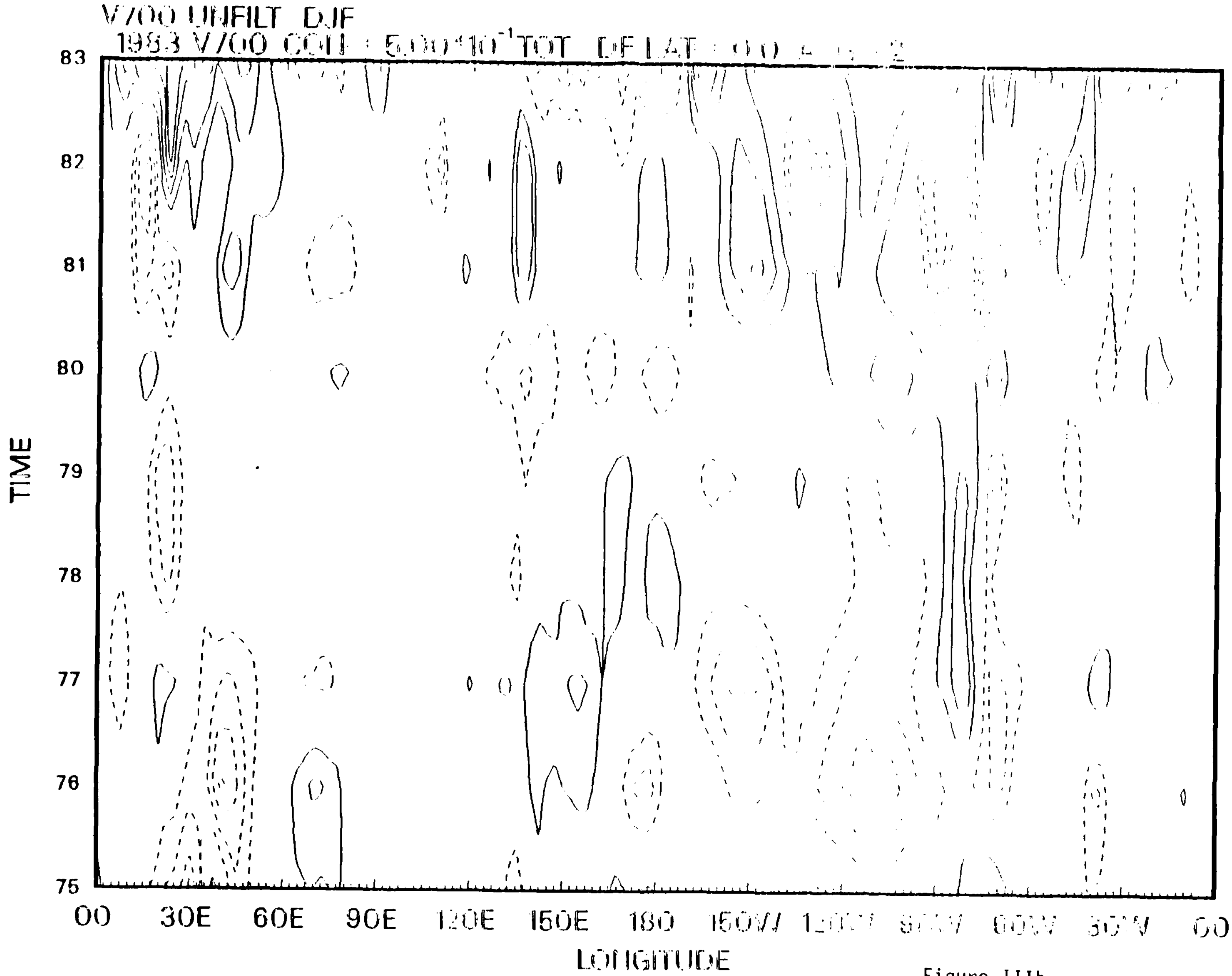
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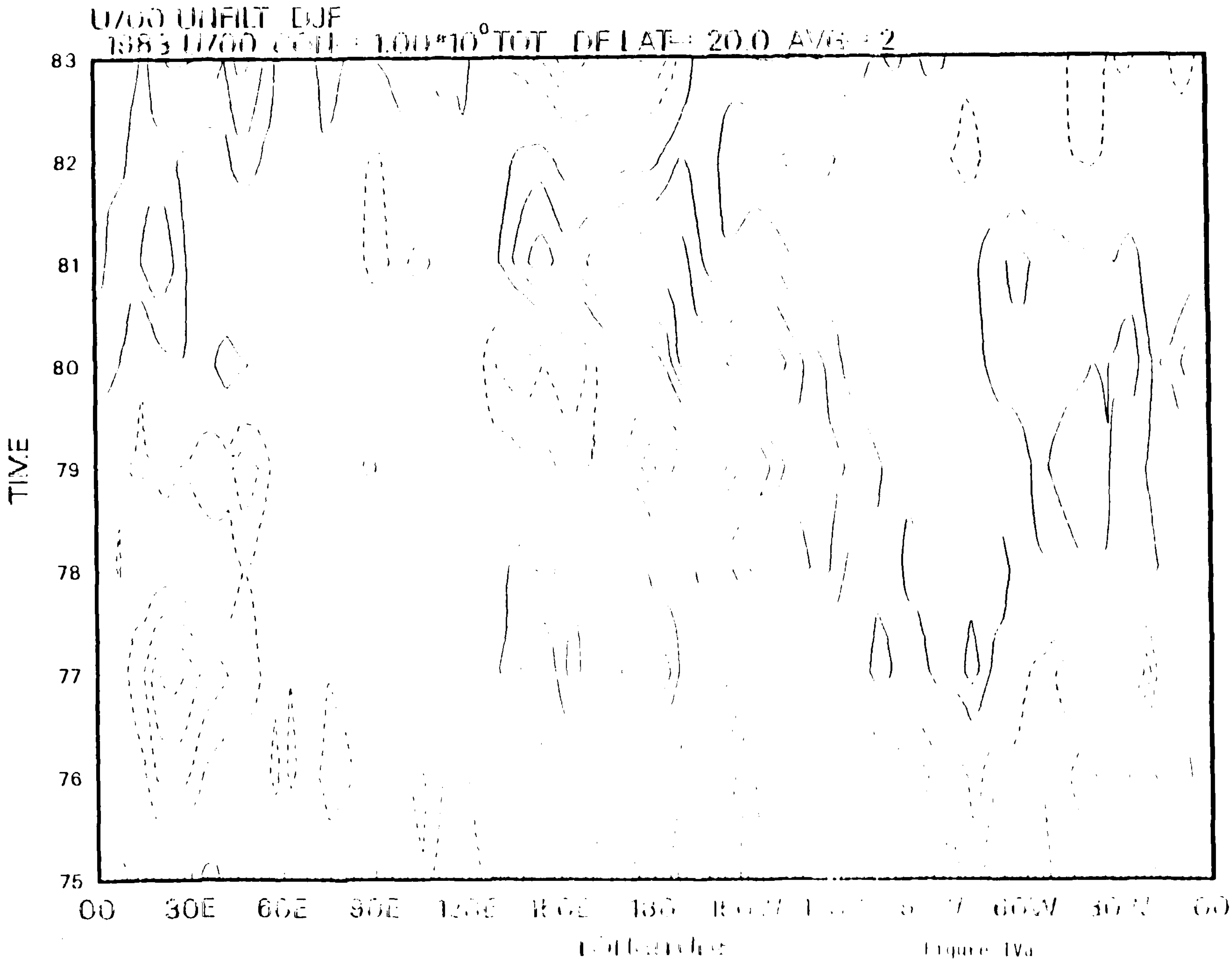
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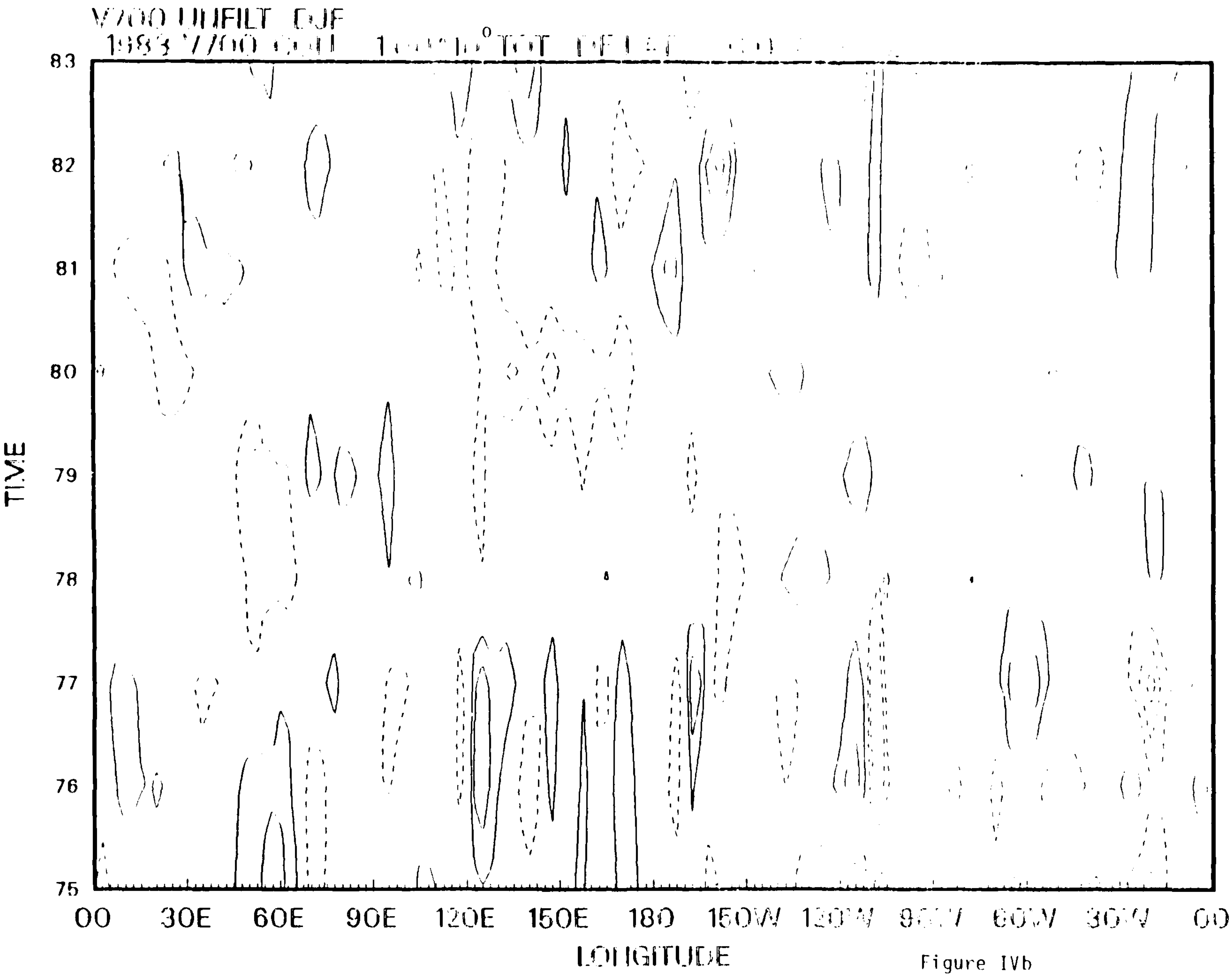
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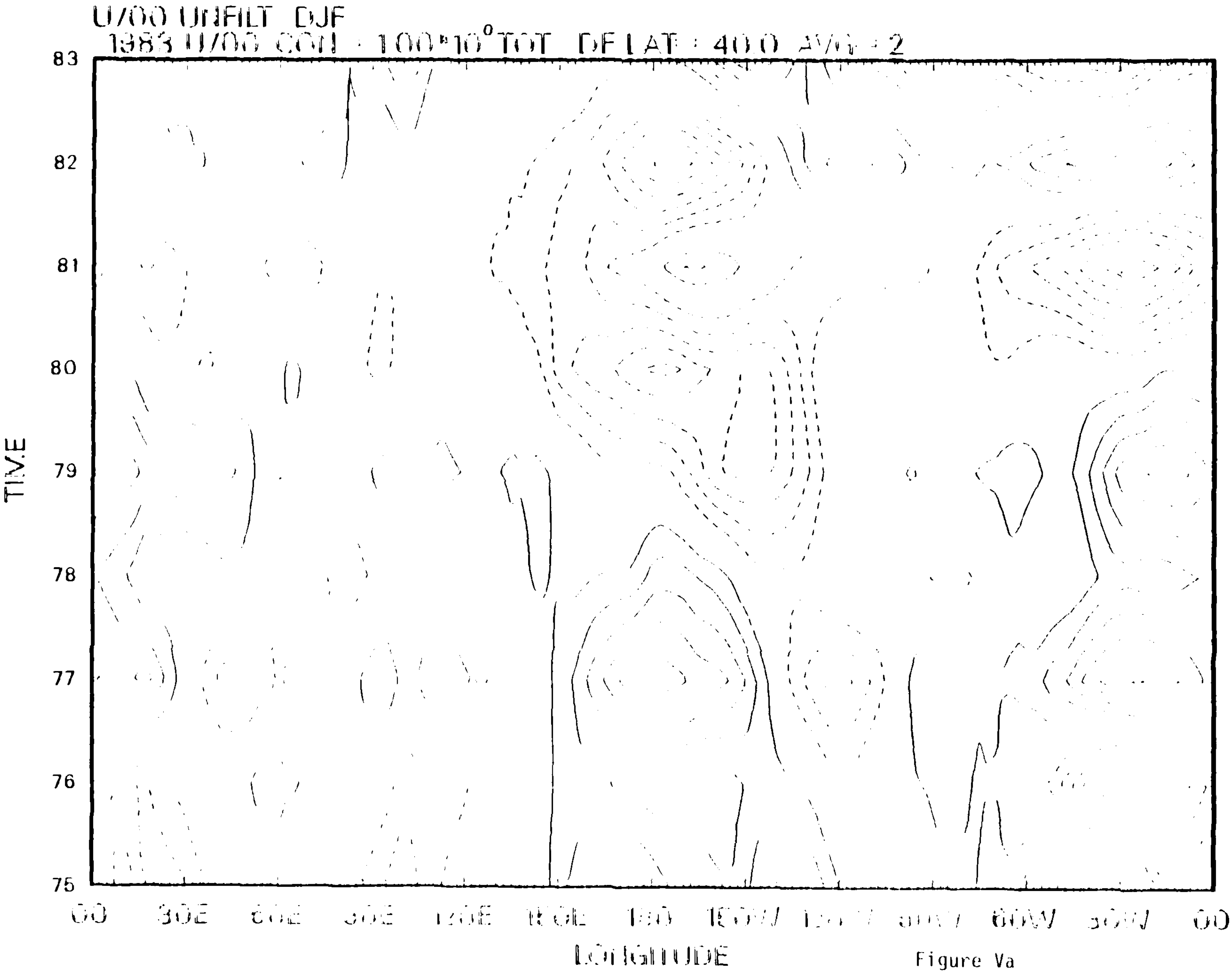

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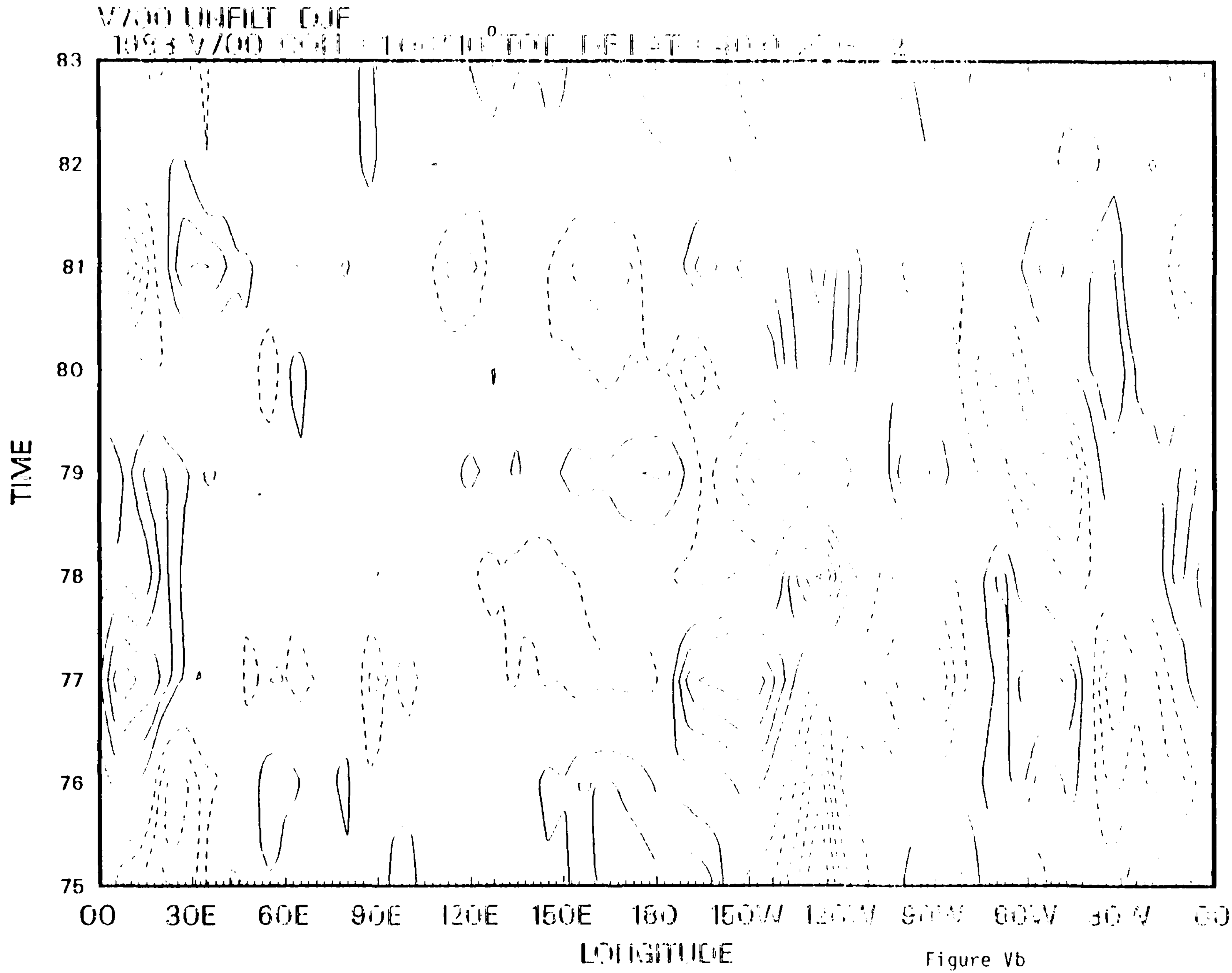
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Figure Vb

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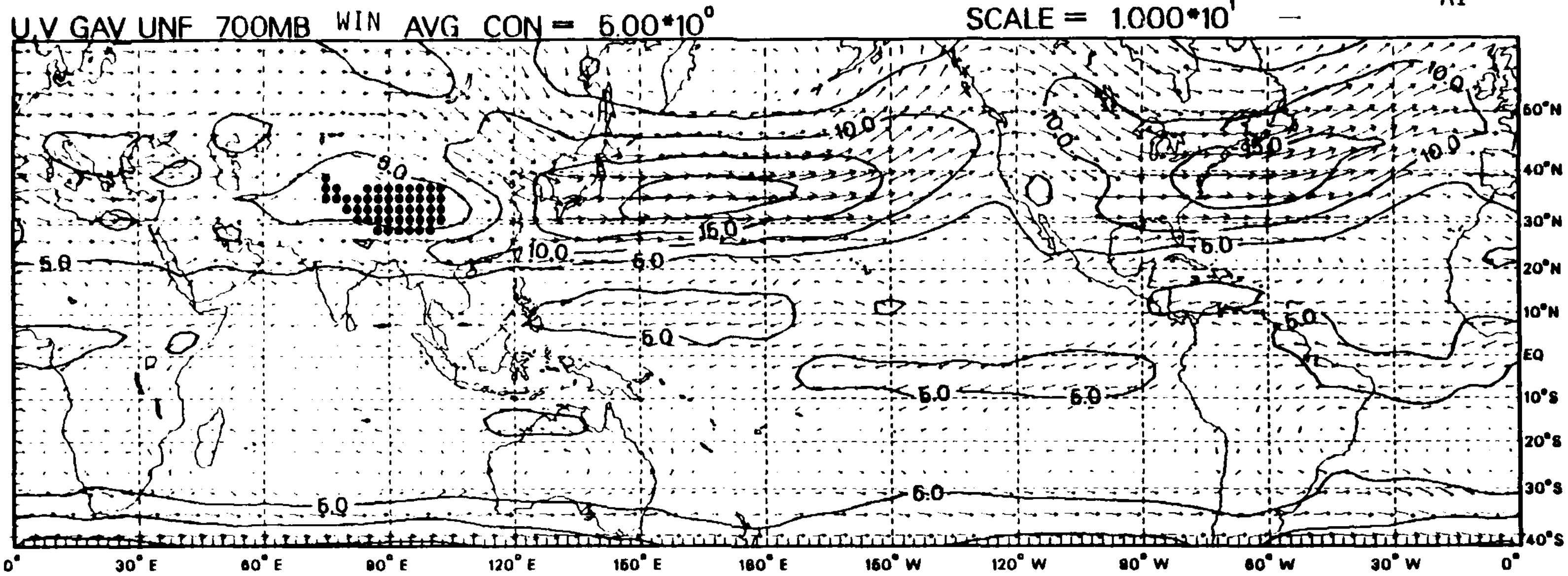
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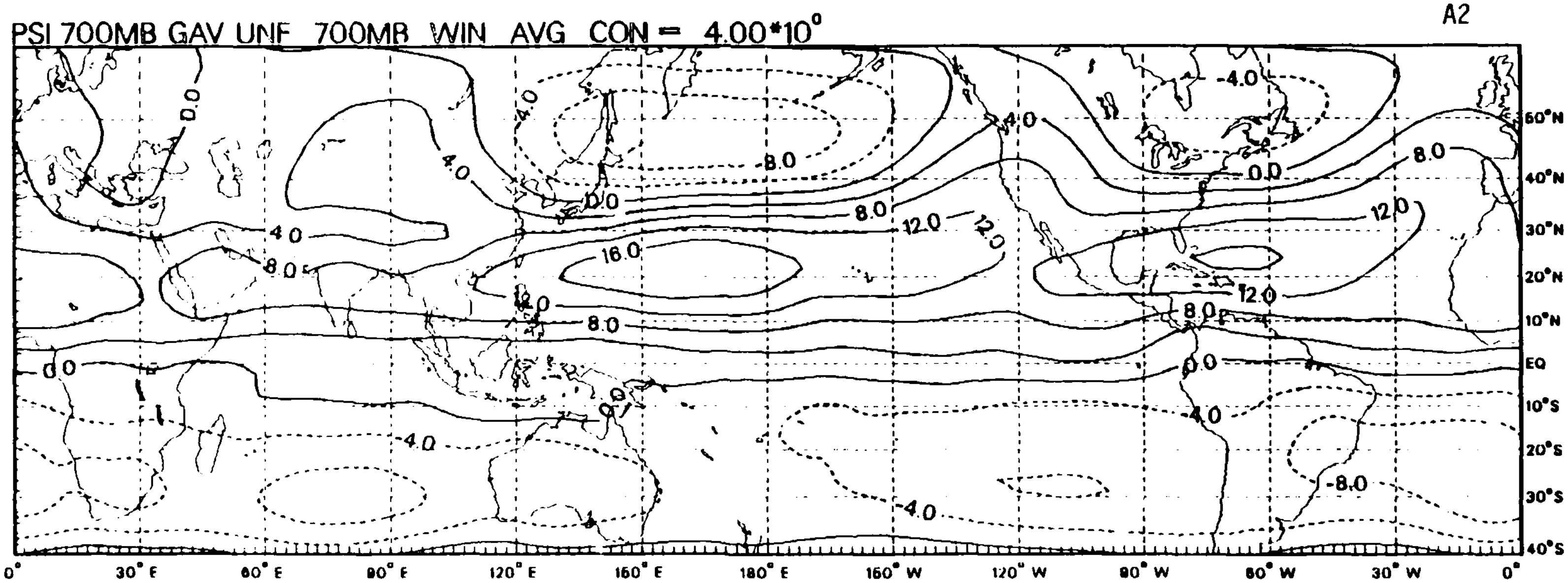
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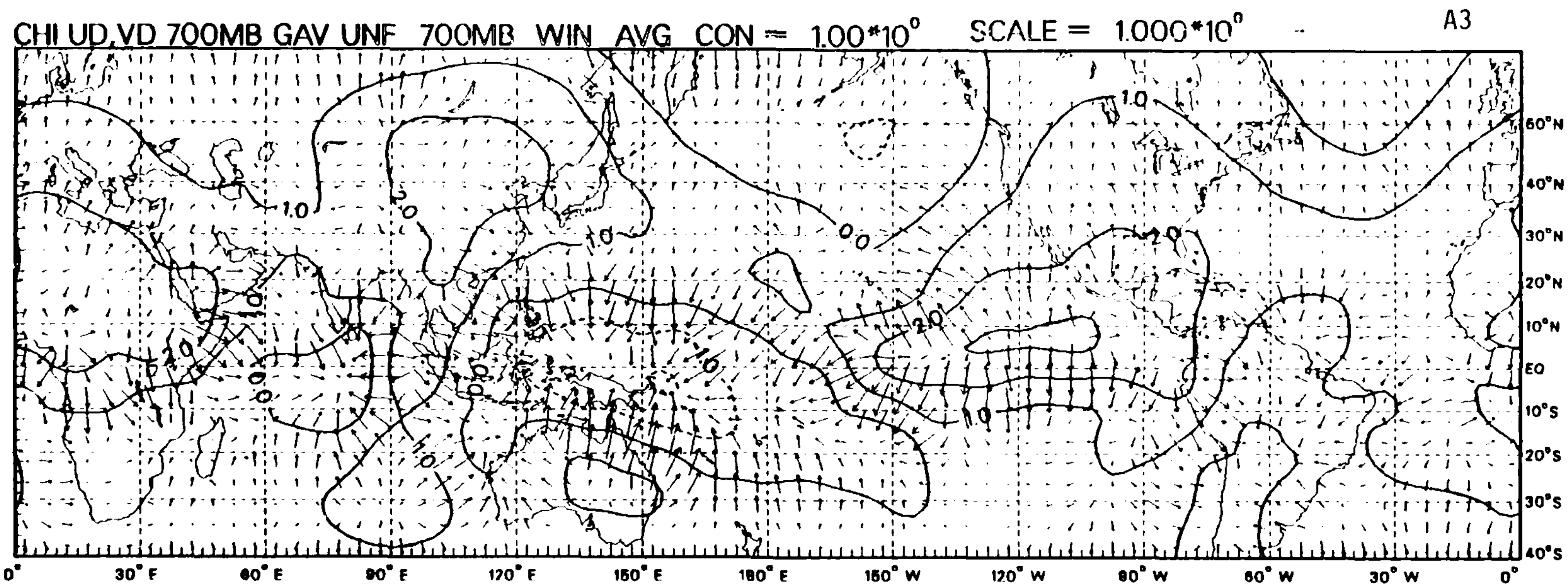
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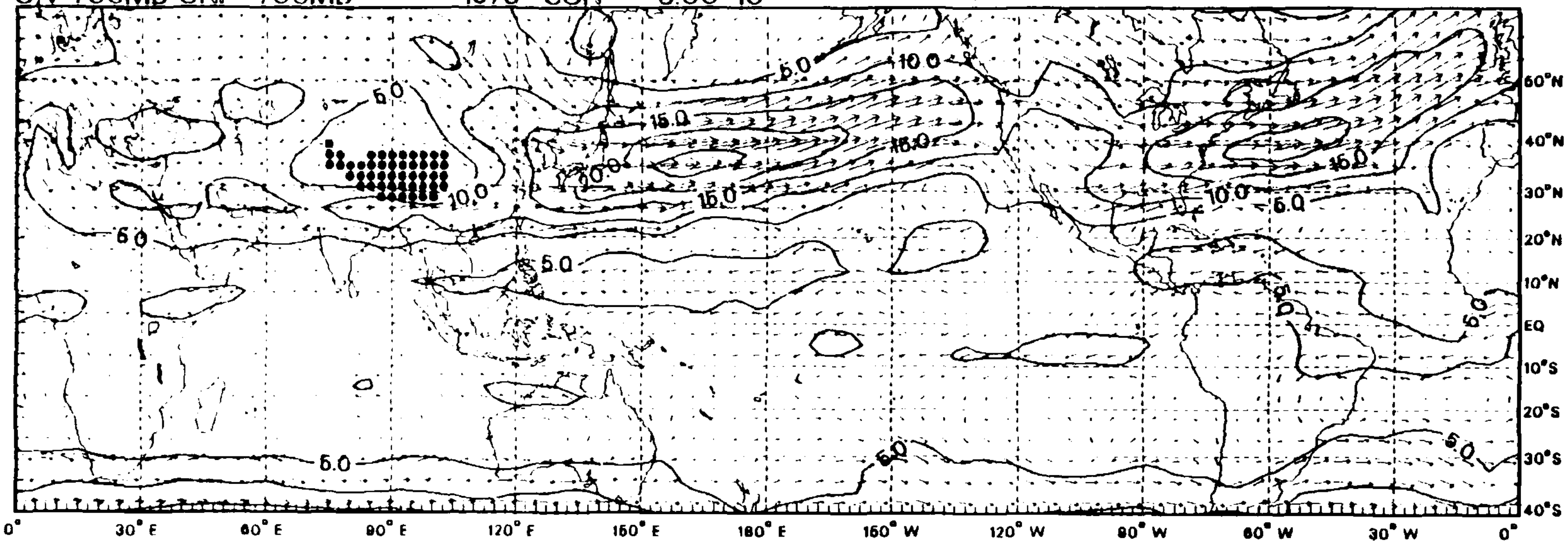


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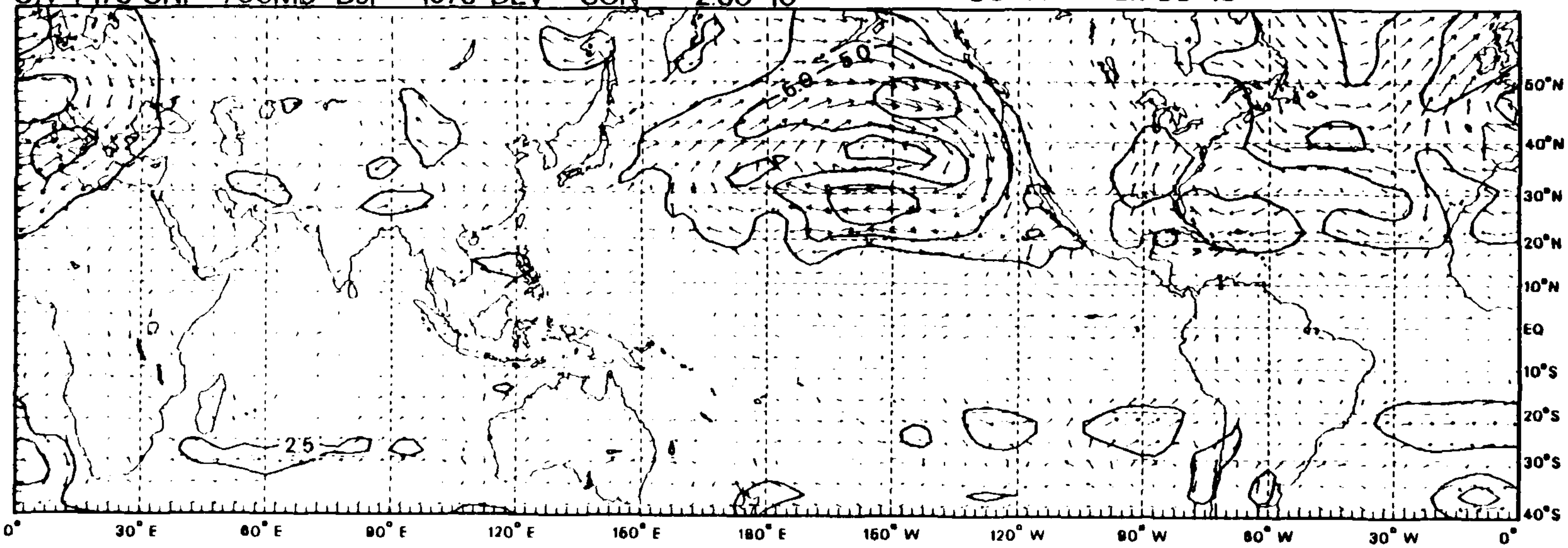
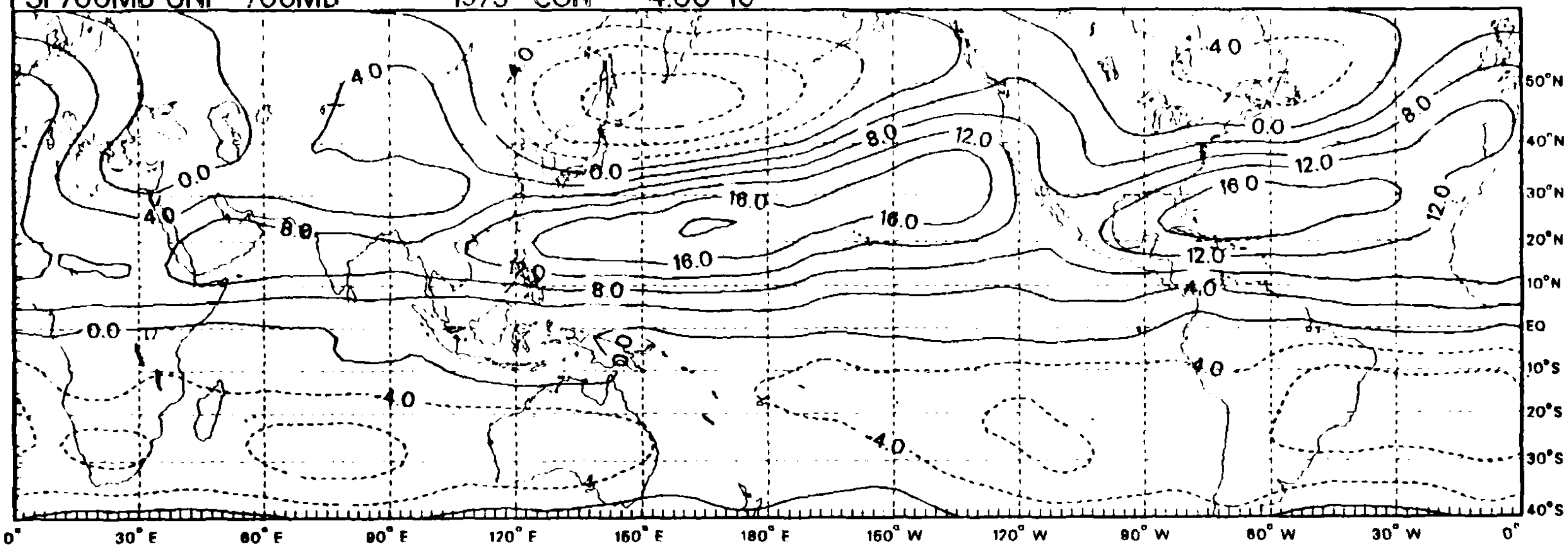
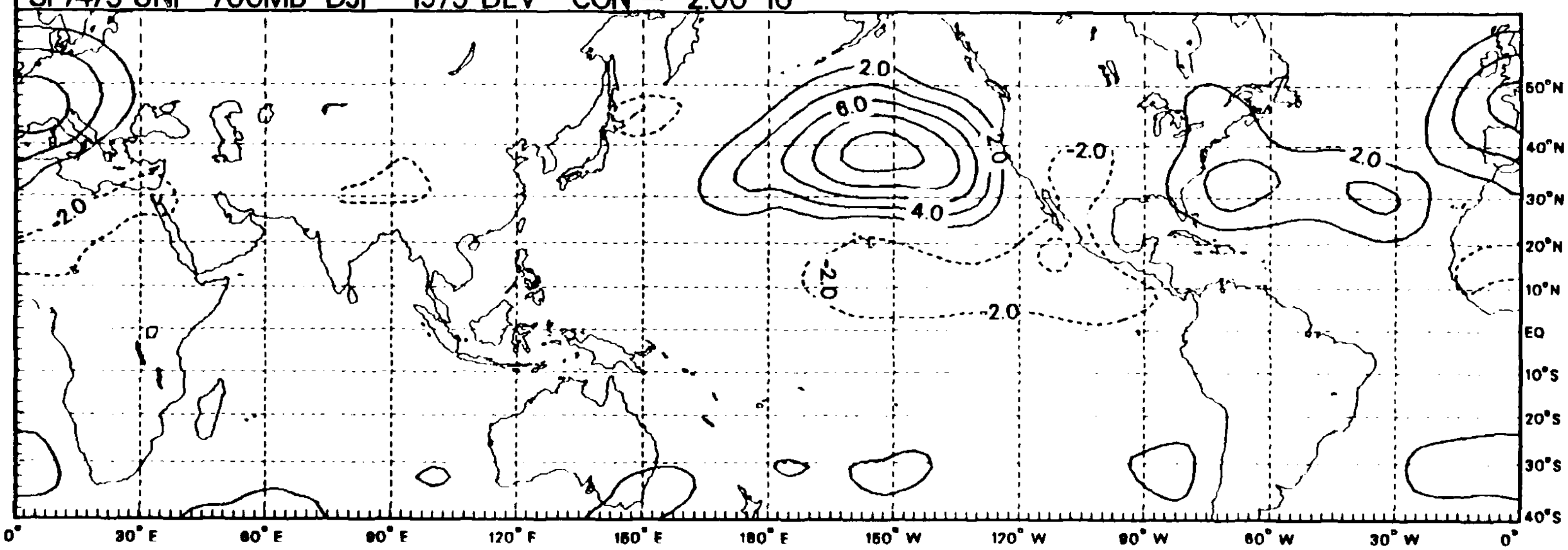


PSI 700MB UNF 700MB DJF 1975 CON = 4.00*10⁰

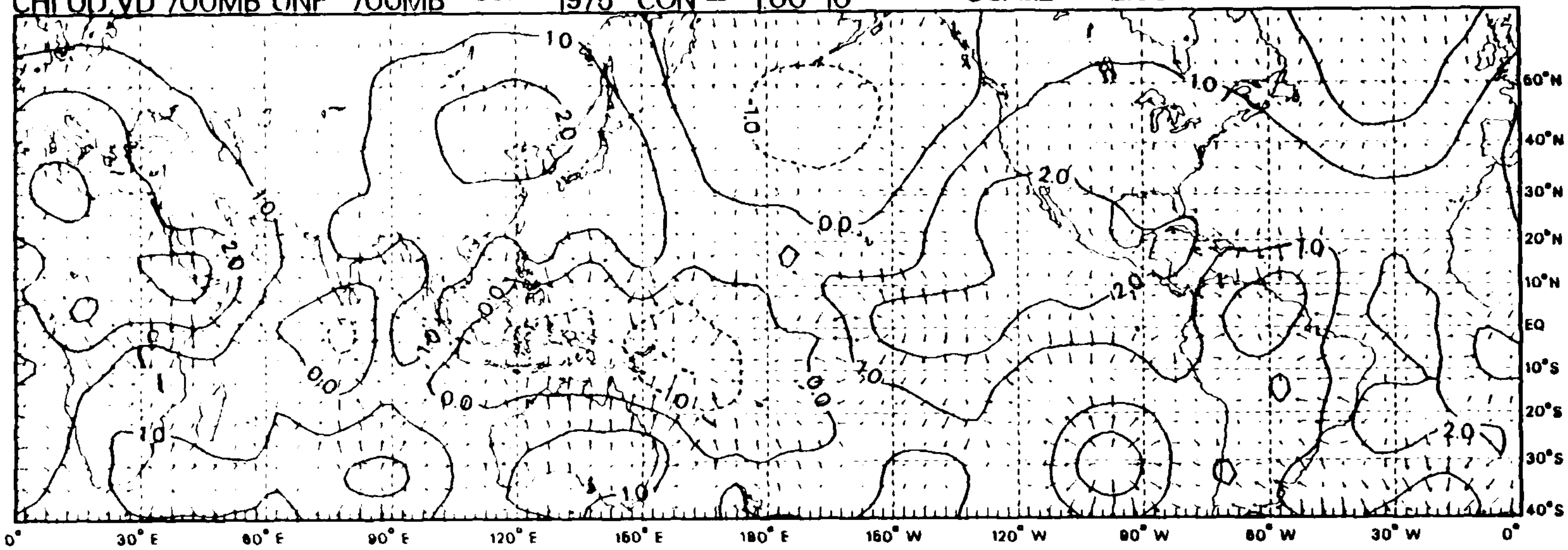


PSI 7475 UNF 700MB DJF 1975 DEV CON = 2.00*10⁰

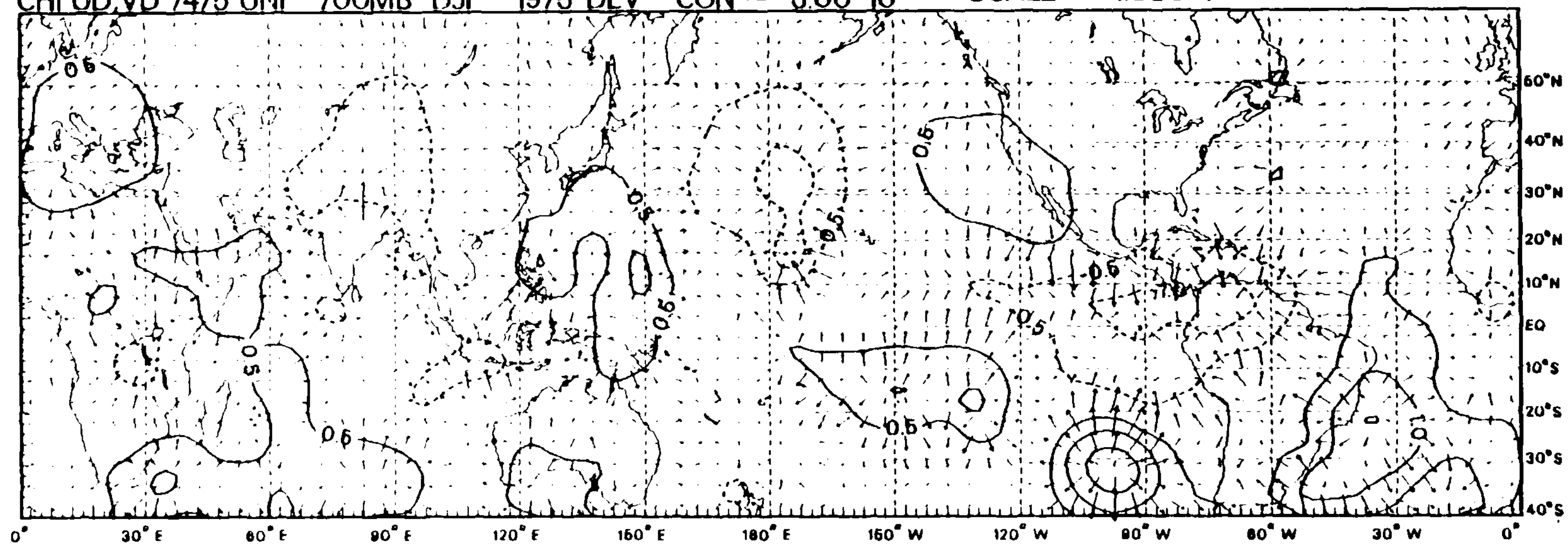


B3

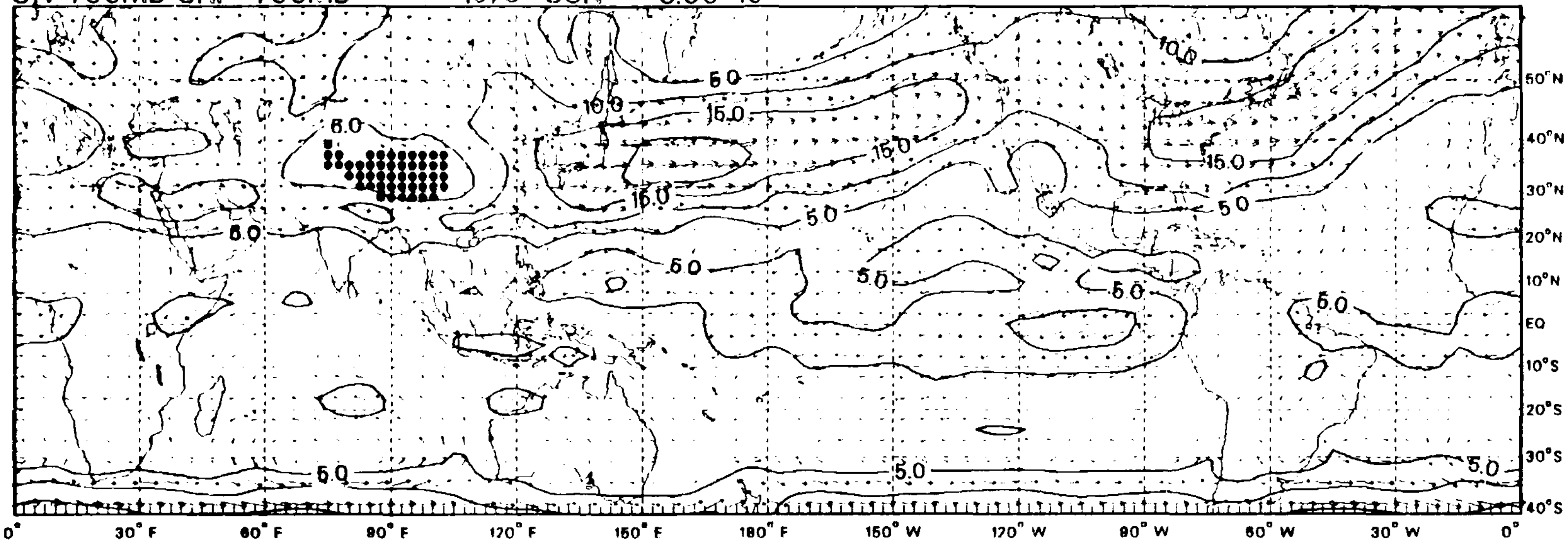
CHI UD,VD 700MB UNF 700MB DJF 1975 CON = 1.00*10^0 SCALE = 2.000*10^0



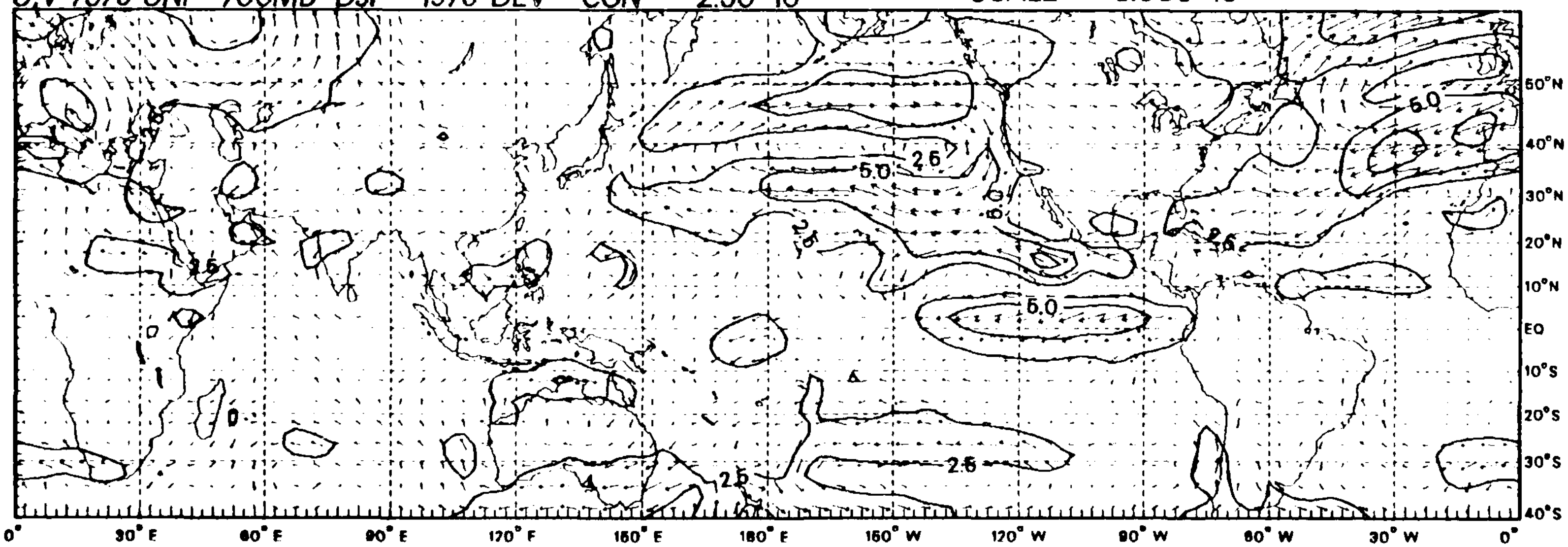

CHI UD,VD 7475 UNF 700MB DJF 1975 DEV CON = 5.00*10^-1 SCALE = 1.000*10^0



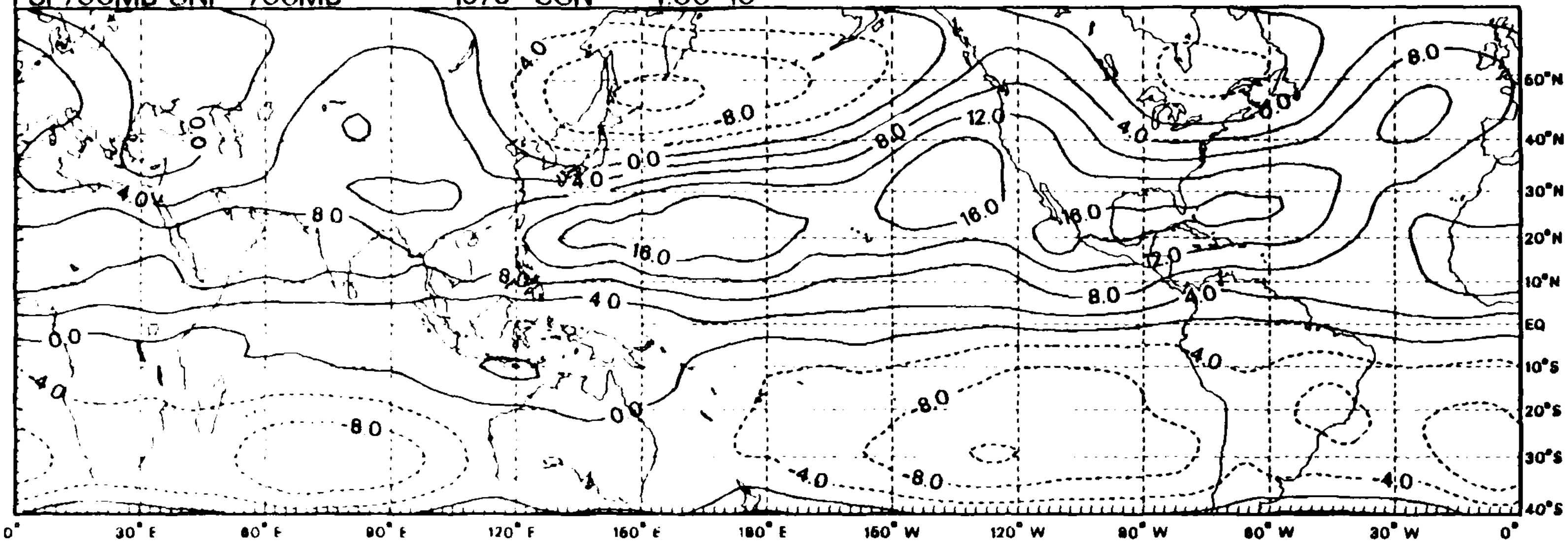
U,V 700MB UNF 700MB DJF 1976 CON = 5.00*10^0 SCALE = 1.000*10^1



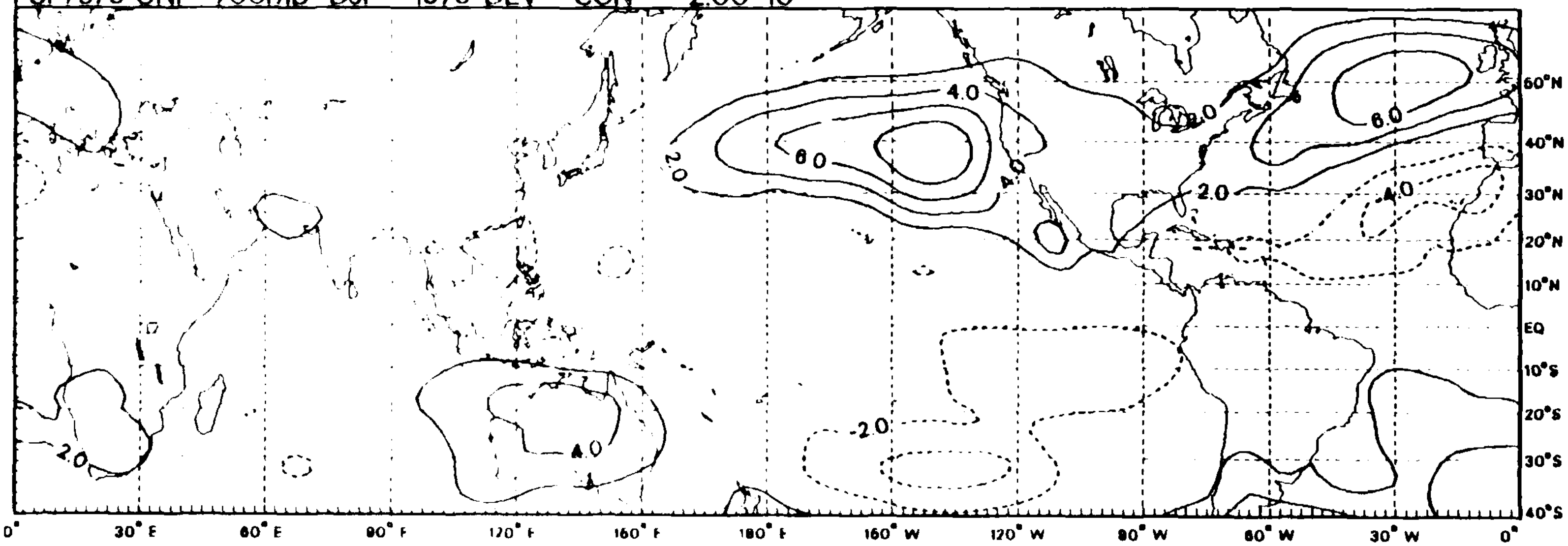
U,V 7576 UNF 700MB DJF 1976 DEV CON = 2.50*10^0 SCALE = 5.000*10^0



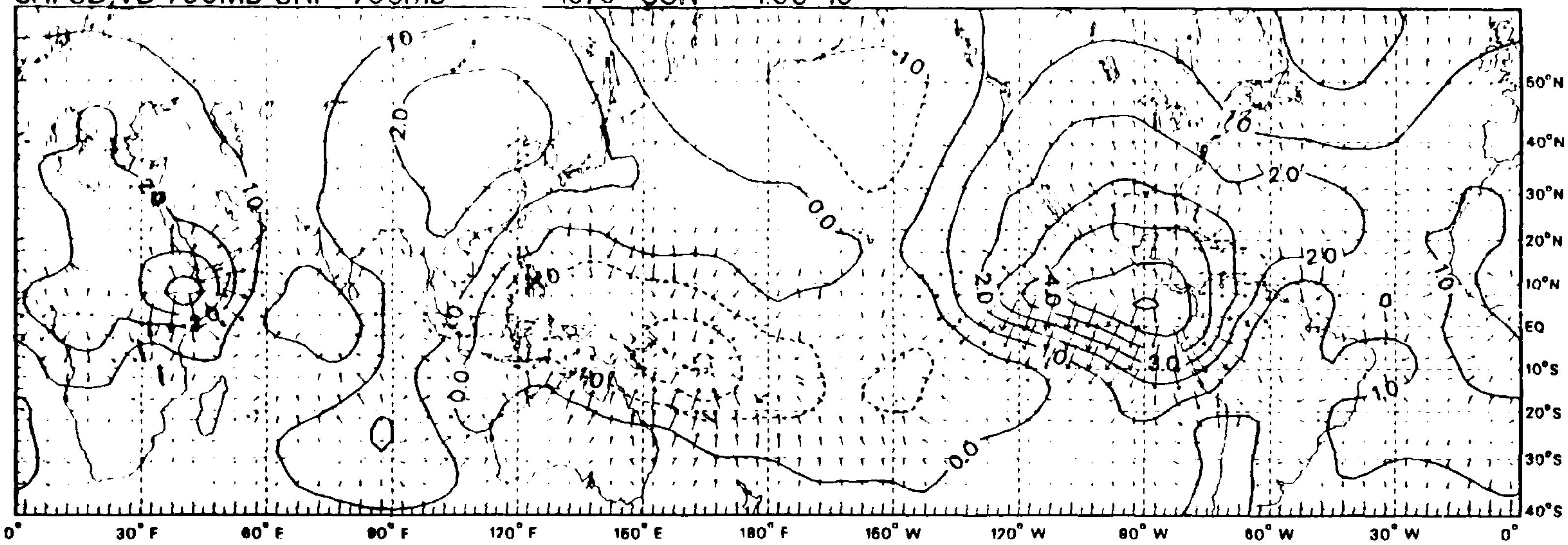
PSI 700MB UNF 700MB DJF 1976 CON = 4.00*10$^0$



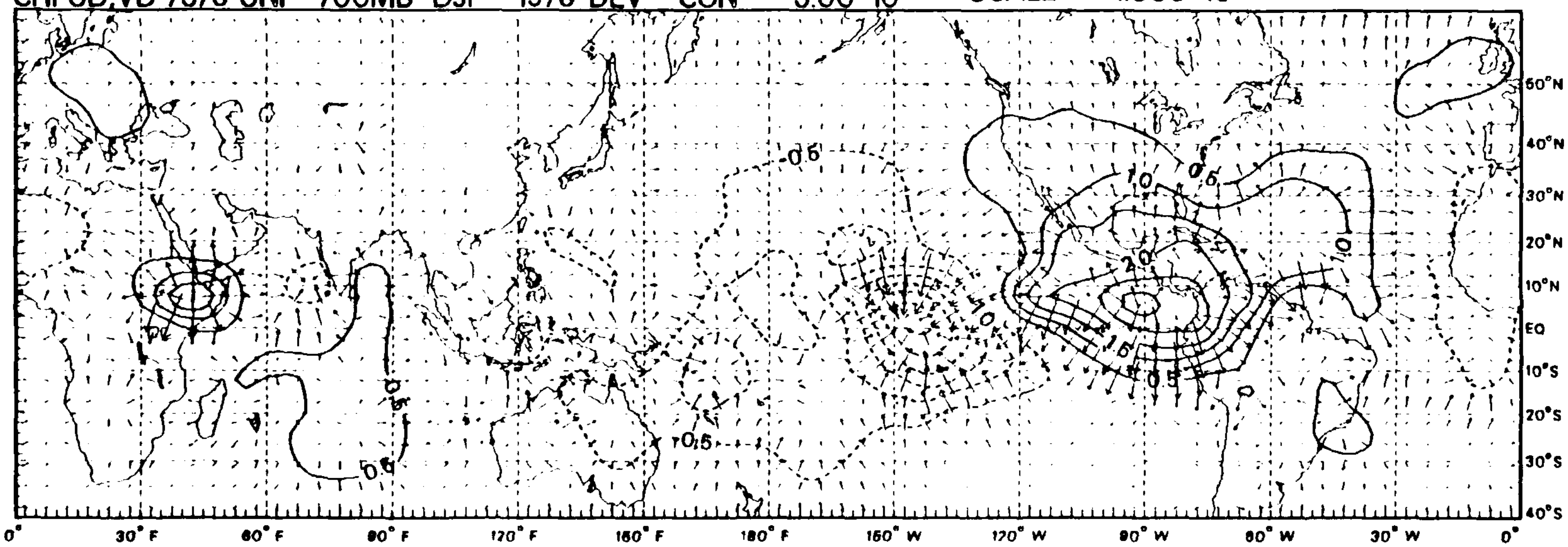

PSI 7576 UNF 700MB DJF 1976 DEV CON = 2.00*10$^0$



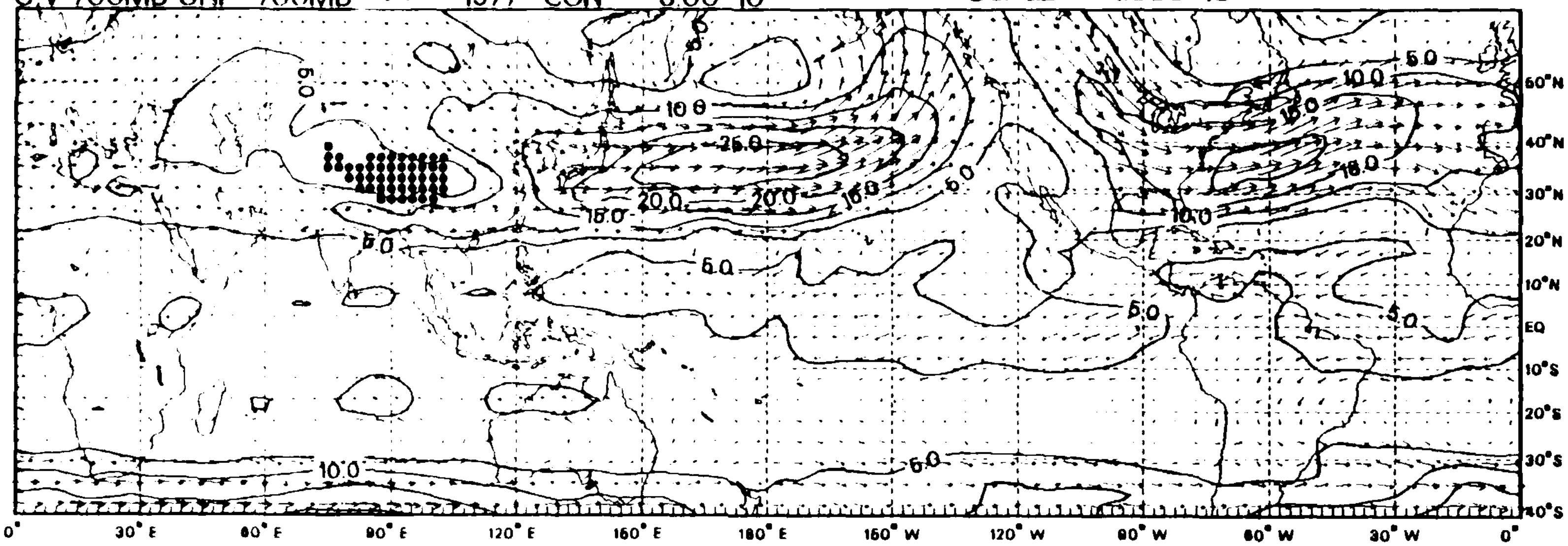
CHI UD,VD 700MB UNF 700MB DJF 1976 CON = 1.00*10^0 SCALE = 2.000*10^0



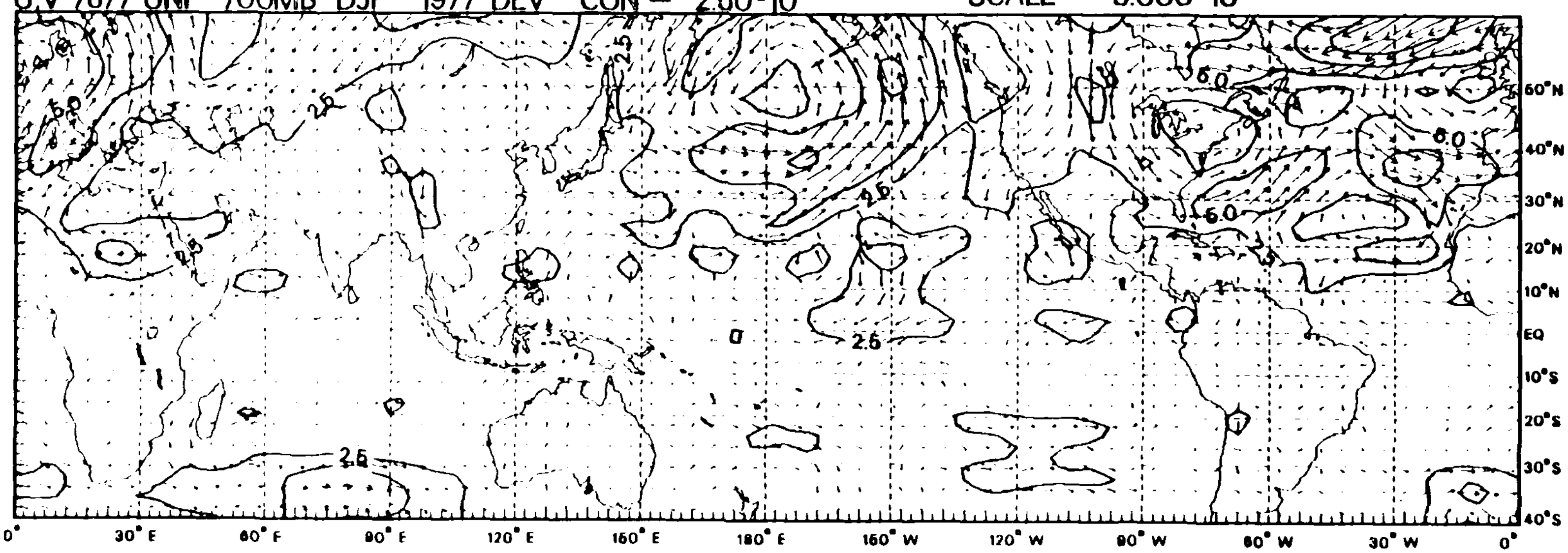

CHI UD,VD 7576 UNF 700MB DJF 1976 DEV CON = 5.00*10^-1 SCALE = 1.000*10^0



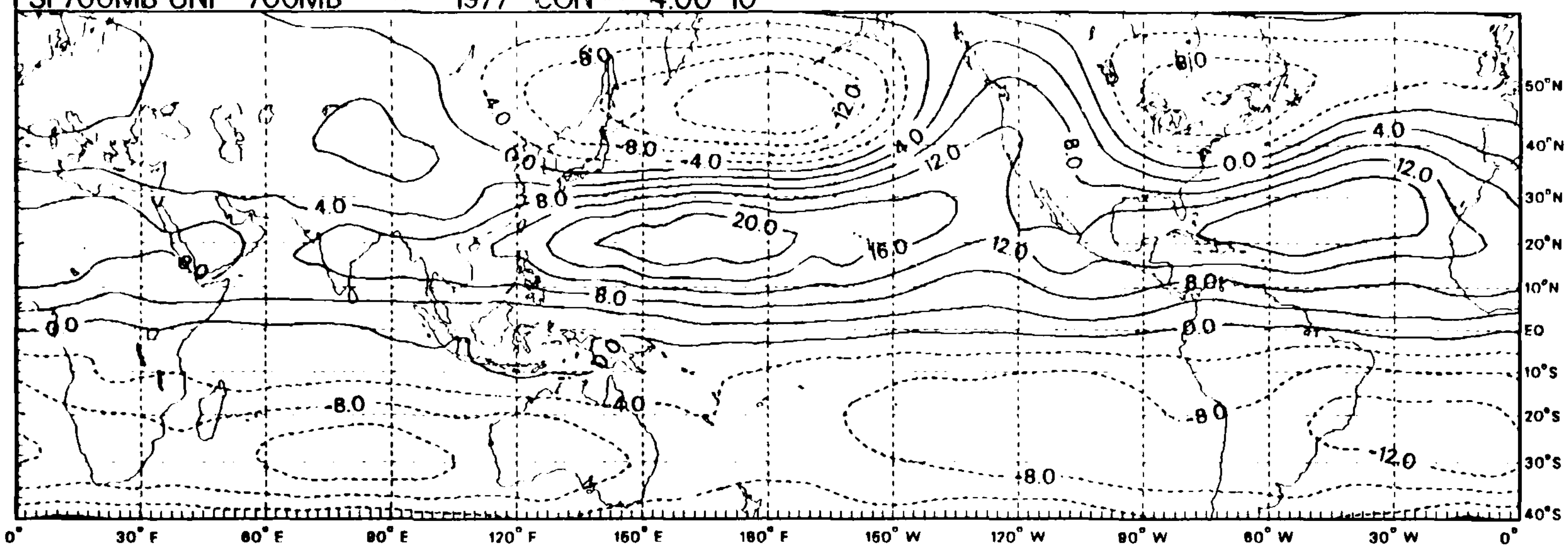
U,V 700MB UNF 700MB DJF 1977 CON = 5.00*10^0 SCALE = 1.000*10^1



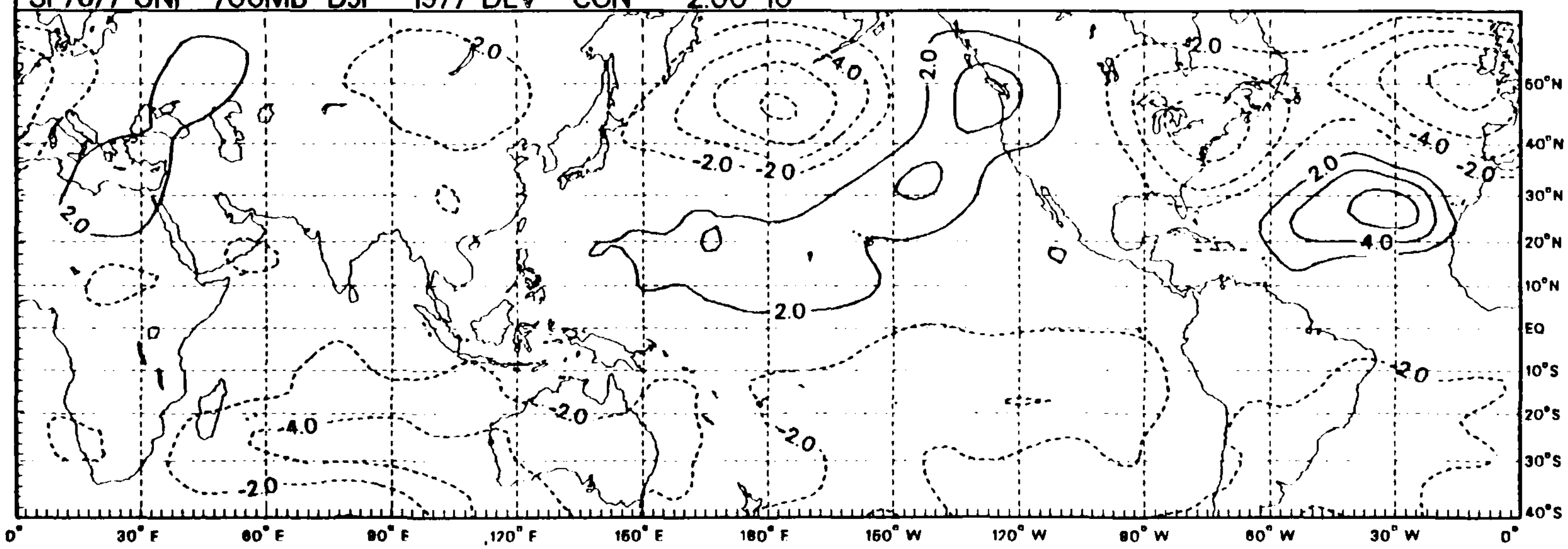

U,V 7677 UNF 700MB DJF 1977 DEV CON = 2.50*10^0 SCALE = 5.000*10^0



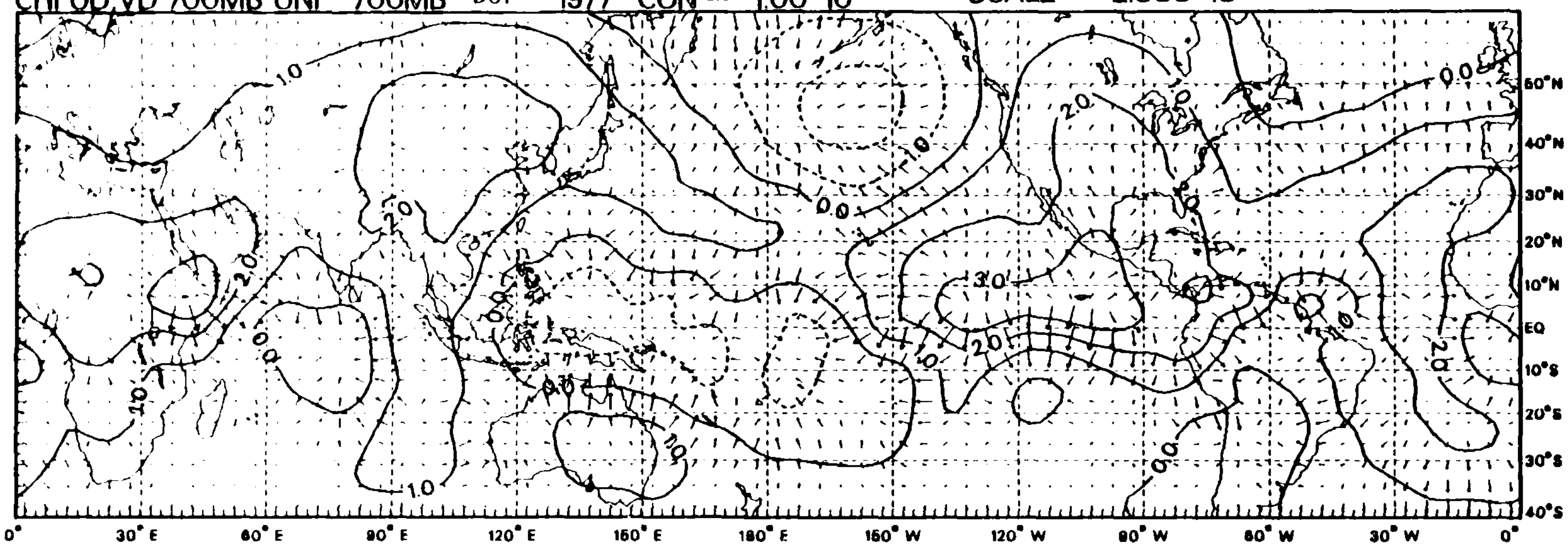
PSI 700MB UNF 700MB DJF 1977 CON = 4.00*10$^0$



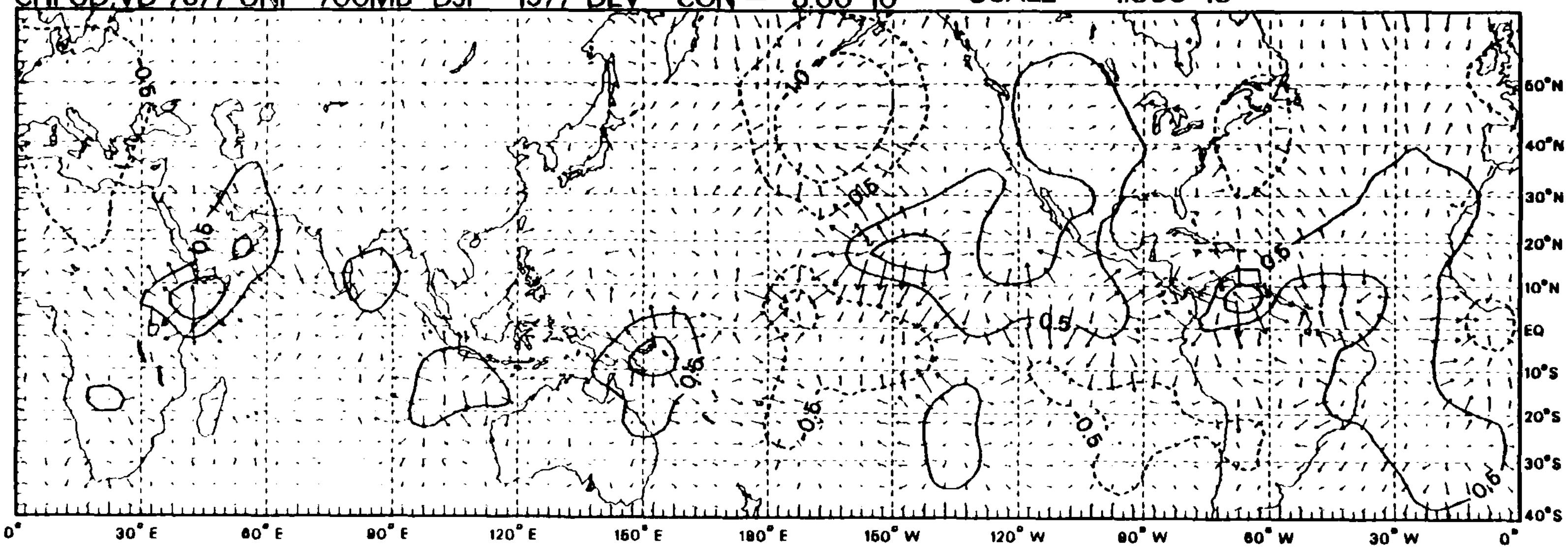

PSI 7677 UNF 700MB DJF 1977 DEV CON = 2.00*10$^0$



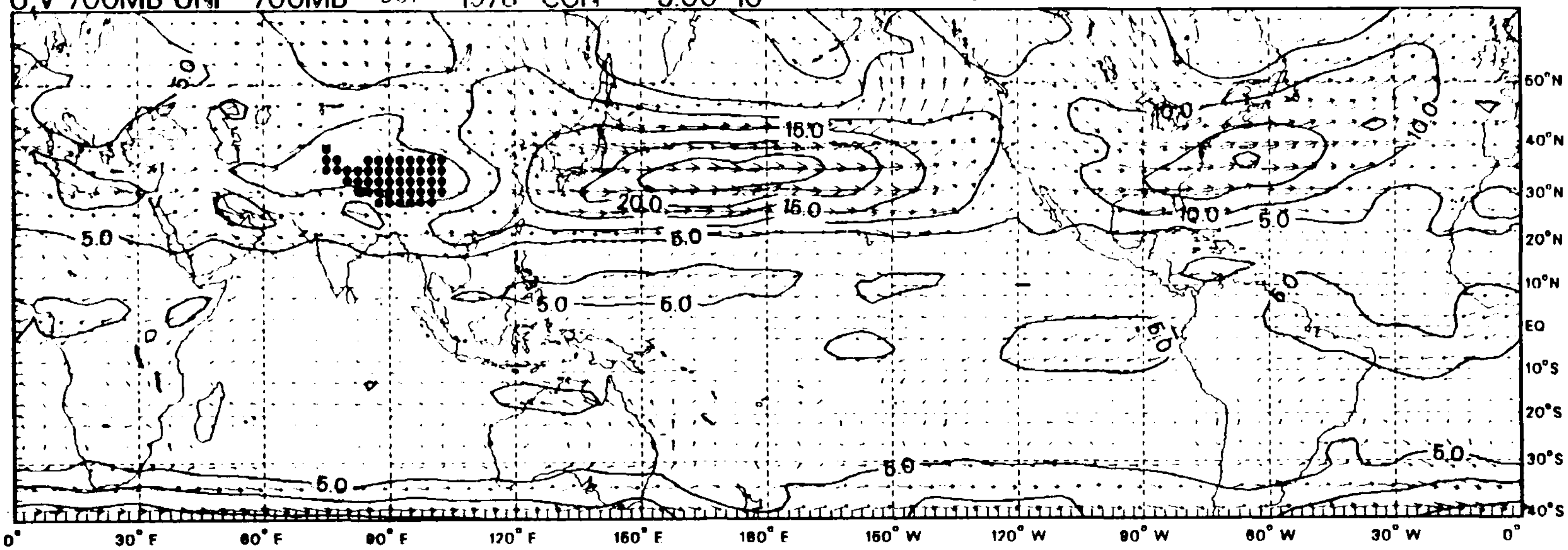
CHI UD,VD 700MB UNF 700MB DJF 1977 CON = $1.00*10^{0}$ SCALE = $2.000*10^{0}$



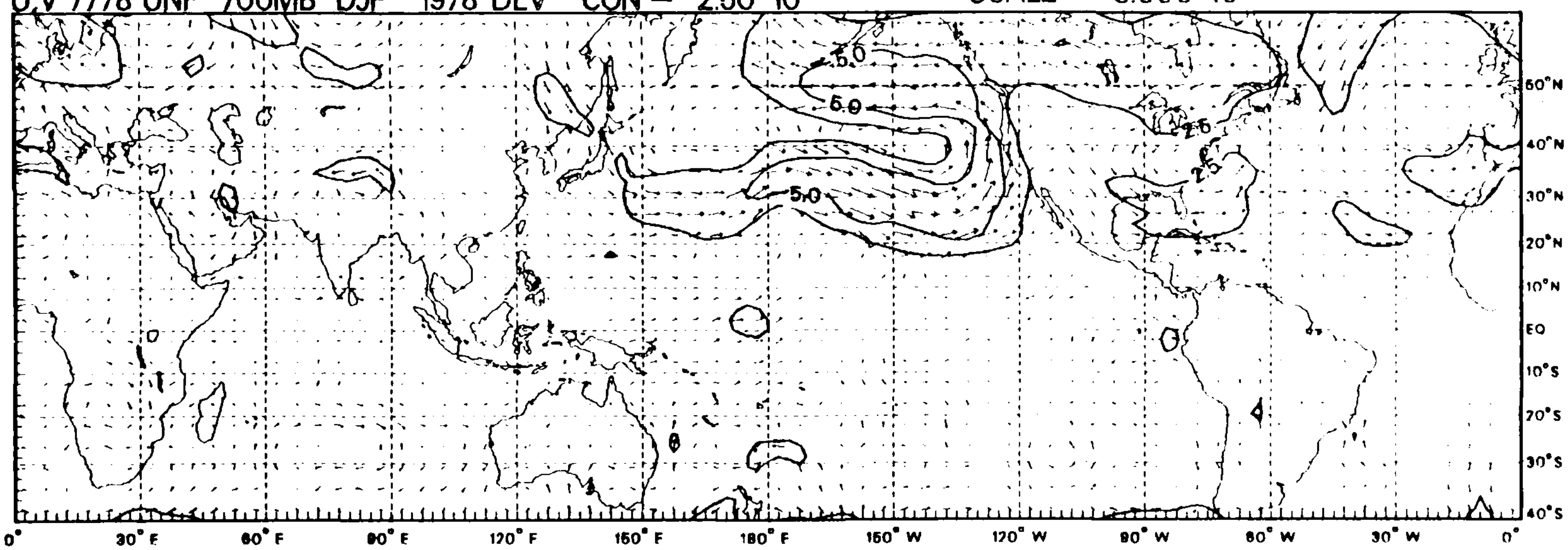

CHI UD,VD 7677 UNF 700MB DJF 1977 DEV CON = $5.00*10^{-1}$ SCALE = $1.000*10^{0}$



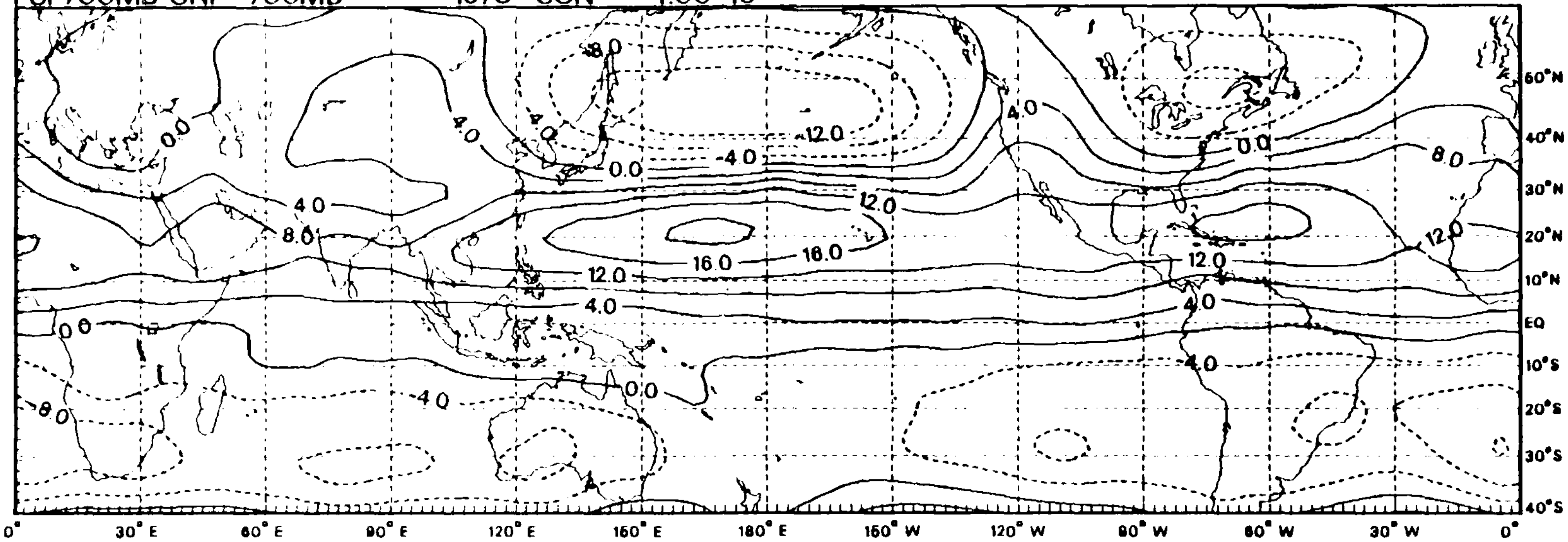
U,V 700MB UNF 700MB DJF 1978 CON = $5.00*10^0$ SCALE = $1.000*10^1$



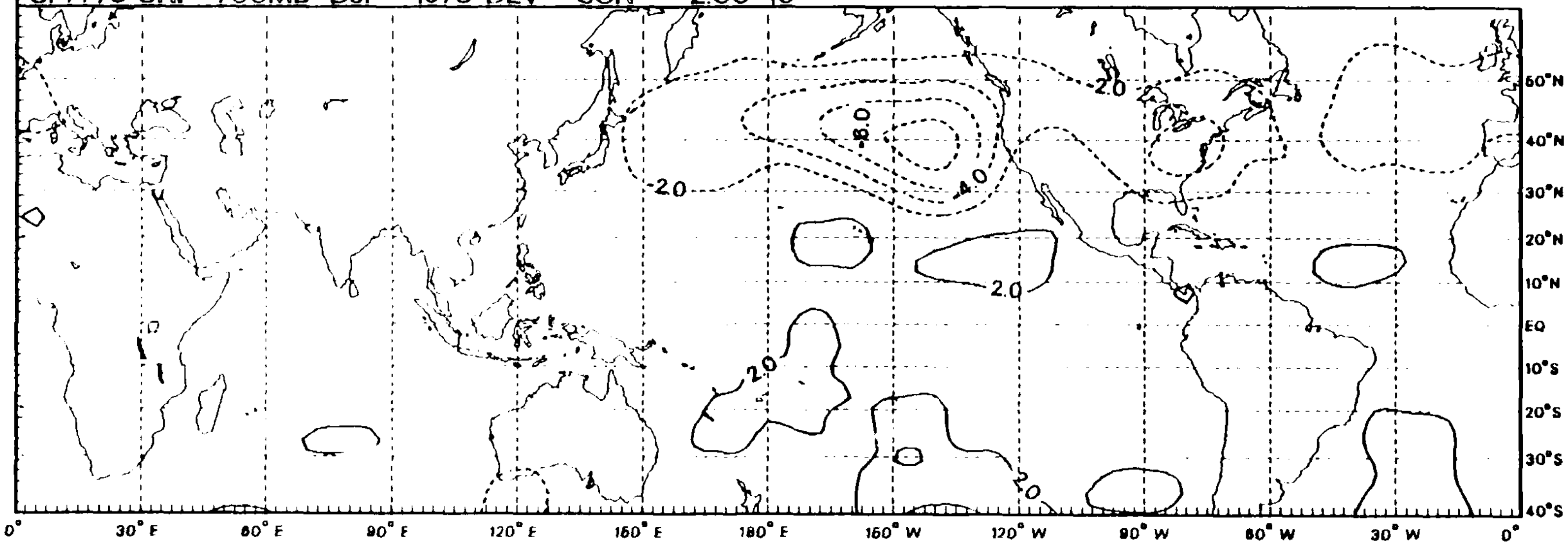

U,V 7778 UNF 700MB DJF 1978 DEV CON = $2.50*10^0$ SCALE = $5.000*10^0$



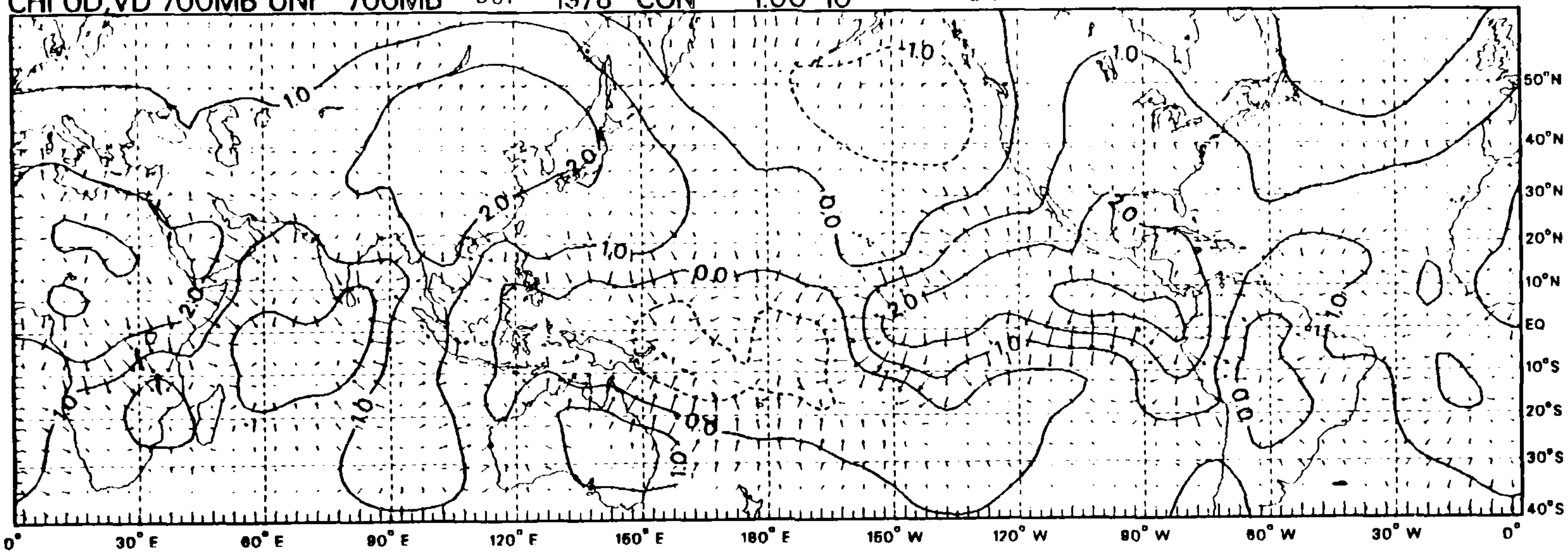
PSI 700MB UNF 700MB DJF 1978 CON = 4.00*10$^0$



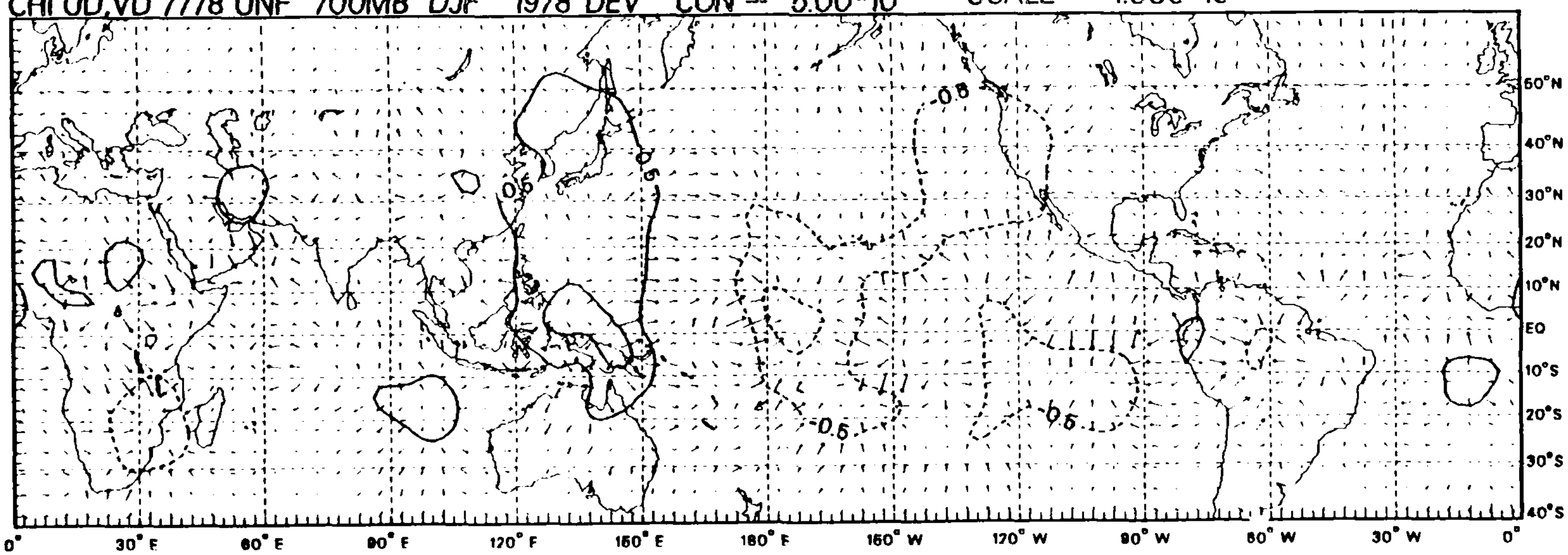

PSI 7778 UNF 700MB DJF 1978 DEV CON = 2.00*10$^0$



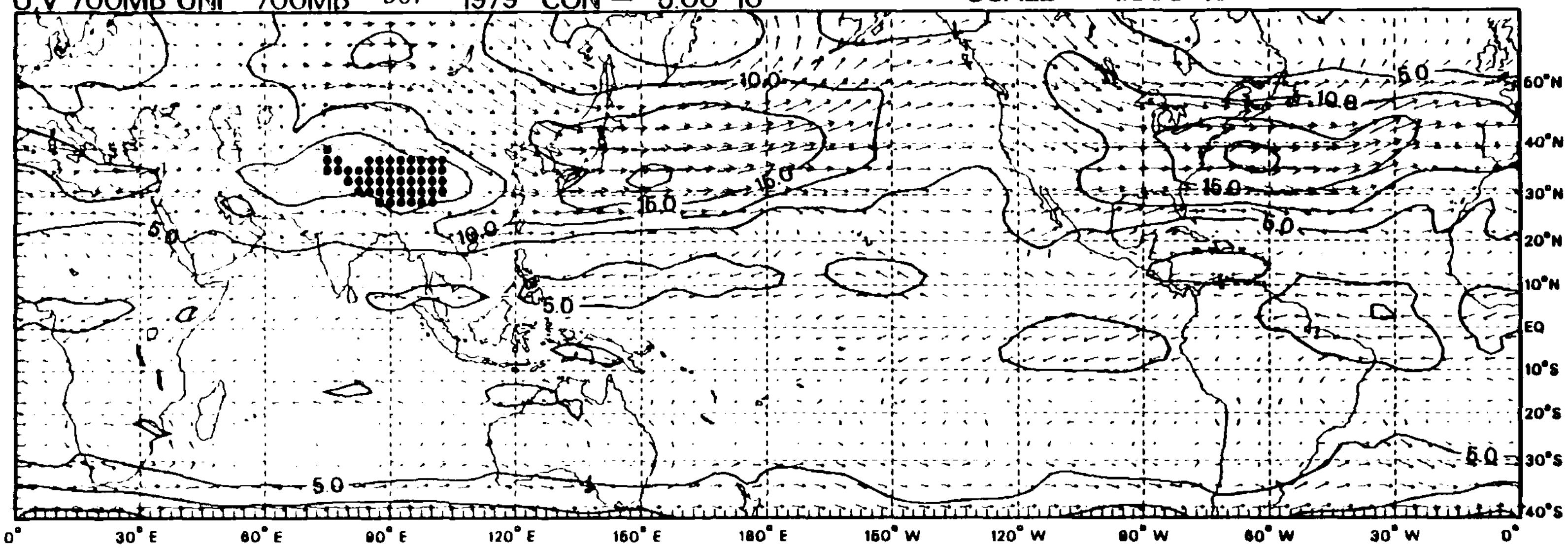
CHI UD,VD 700MB UNF 700MB DJF 1978 CON = 1.00*10⁰ SCALE = 2.000*10⁰



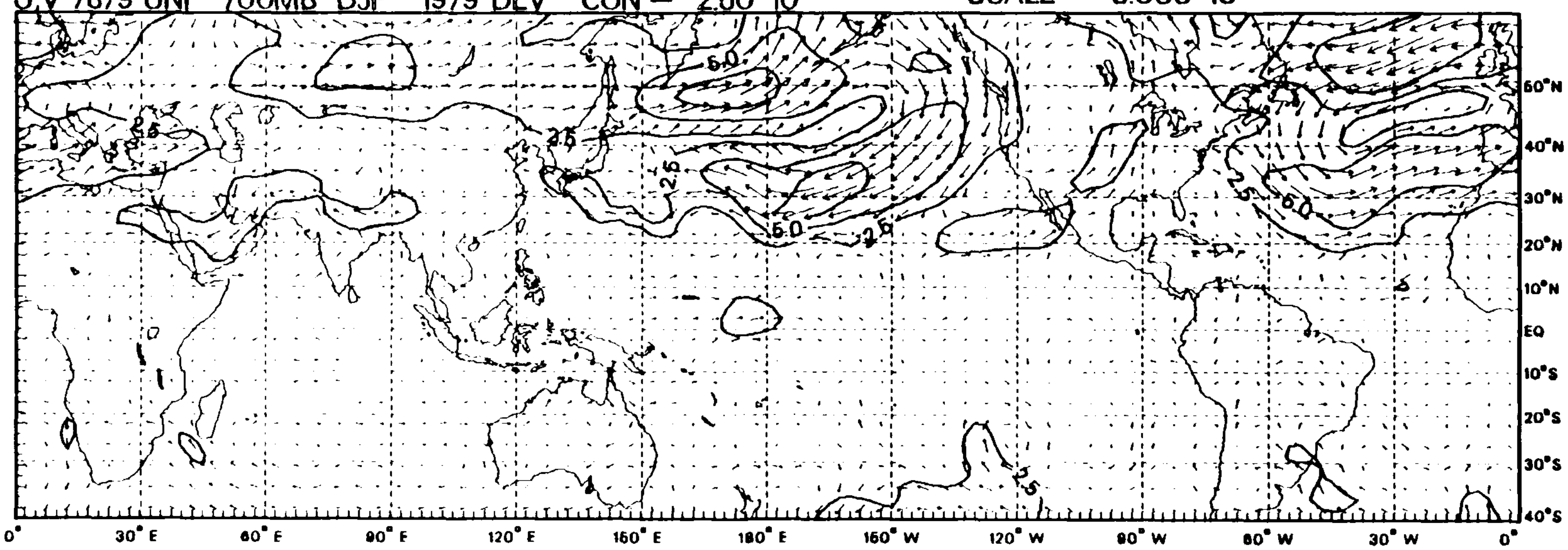

CHI UD,VD 7778 UNF 700MB DJF 1978 DEV CON = 5.00*10⁻¹ SCALE = 1.000*10⁰



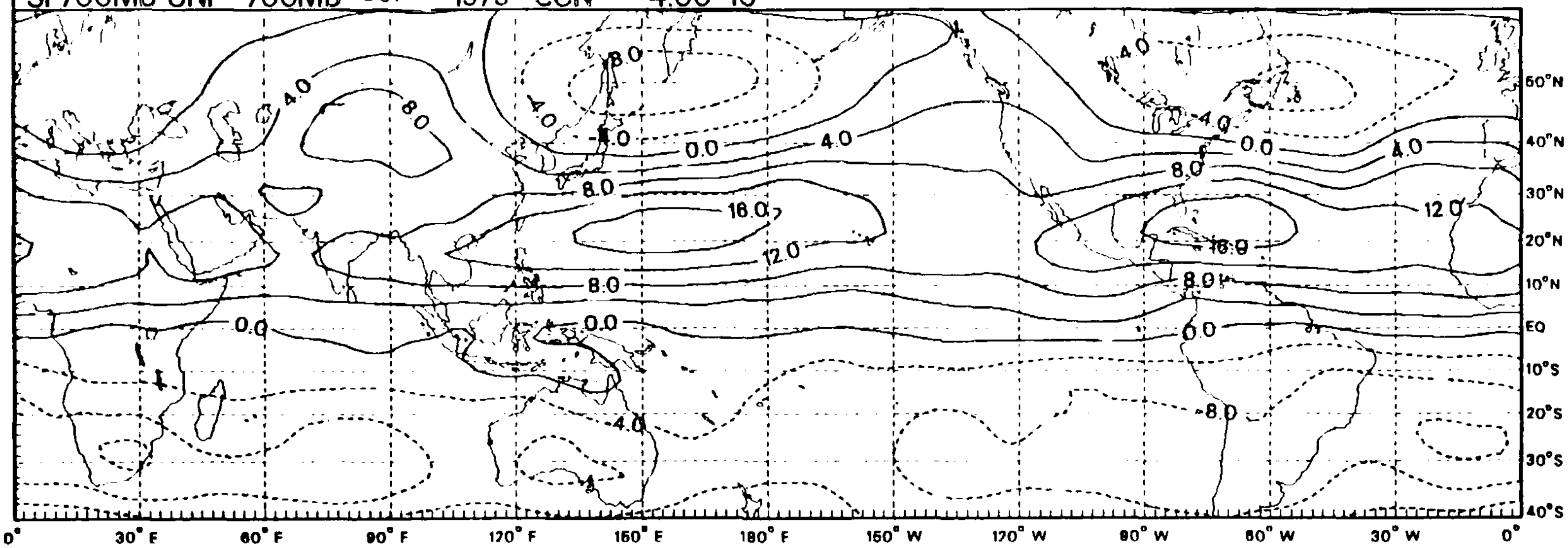
U,V 700MB UNF 700MB DJF 1979 CON = 5.00*10^0 SCALE = 1.000*10^1



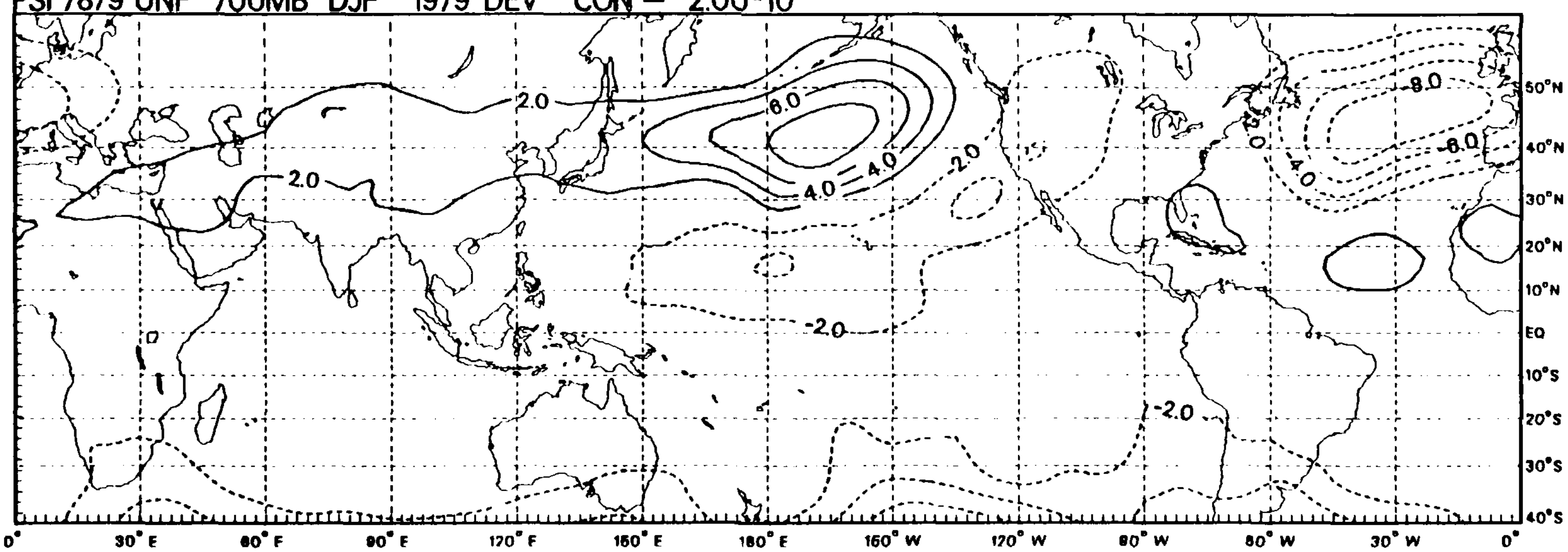

U,V 7879 UNF 700MB DJF 1979 DEV CON = 2.50*10^0 SCALE = 5.000*10^0



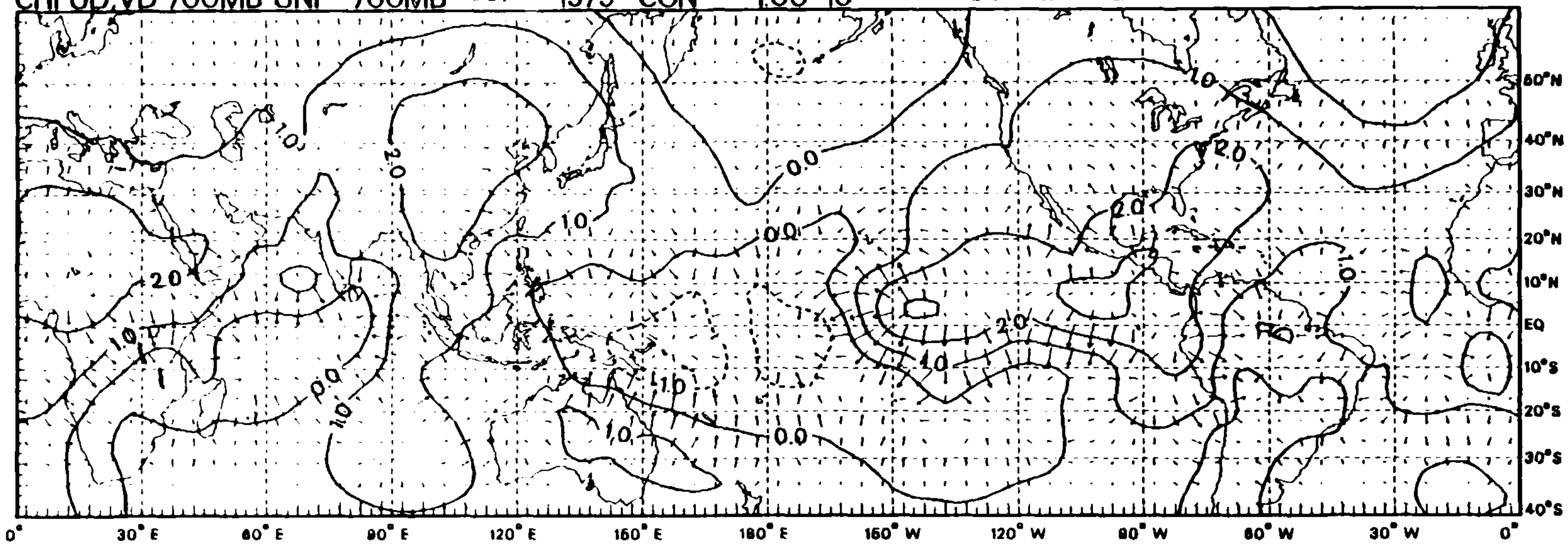
PSI 700MB UNF 700MB DJF 1979 CON = 4.00*10$^0$



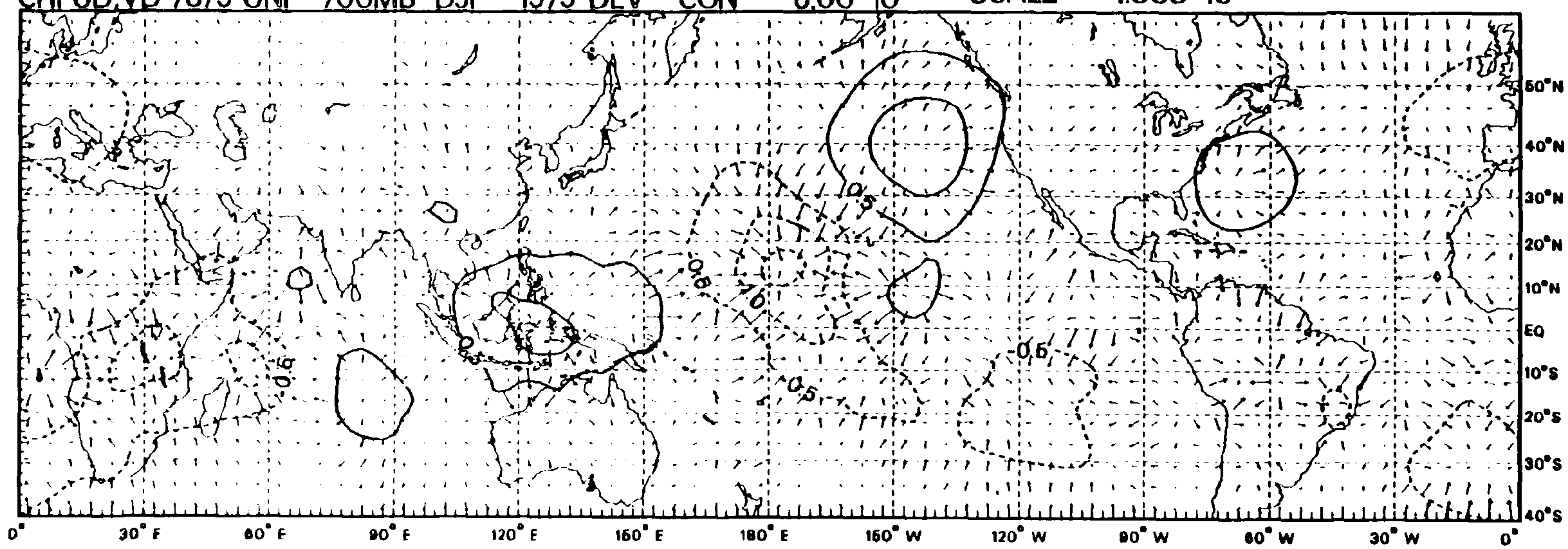

PSI 7879 UNF 700MB DJF 1979 DEV CON = 2.00*10$^0$



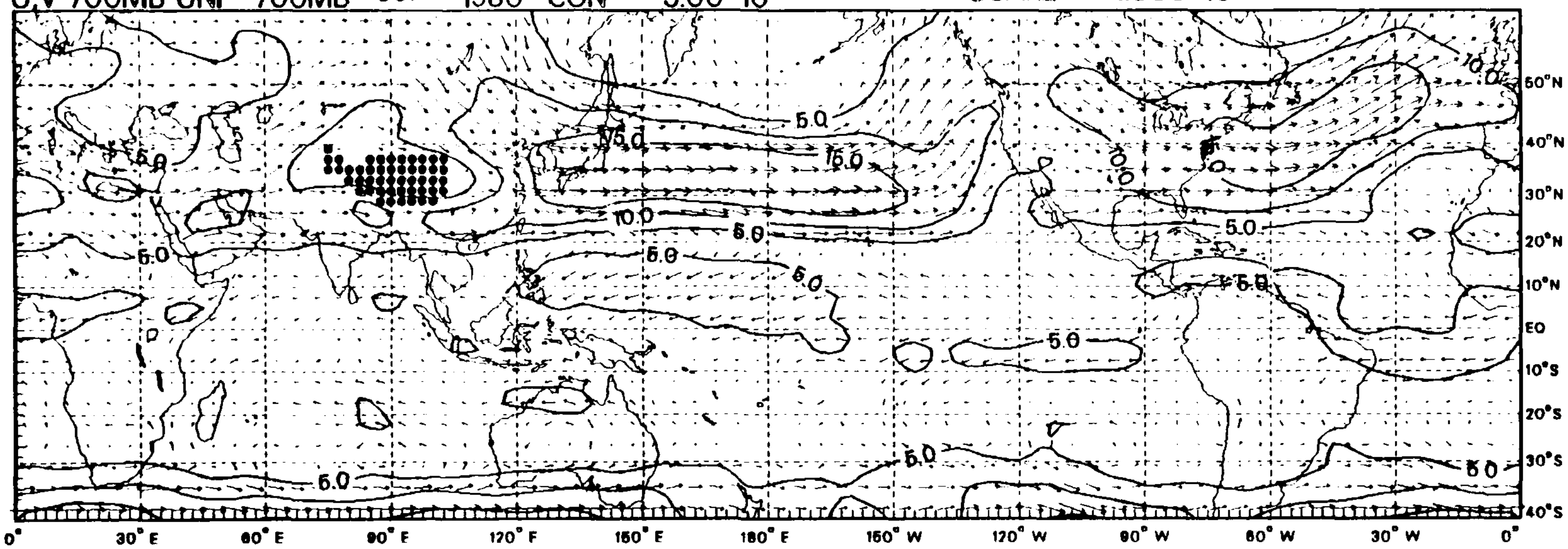
CHI UD,VD 700MB UNF 700MB DJF 1979 CON = 1.00*10^0 SCALE = 2.000*10^0



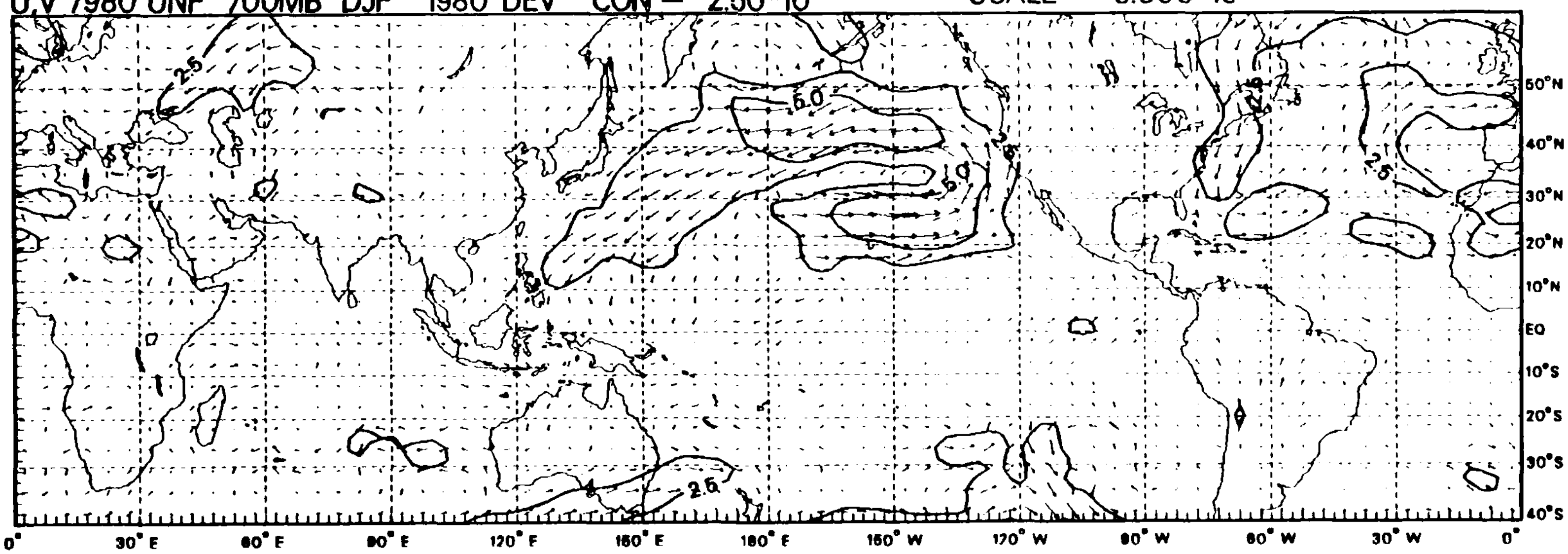

CHI UD,VD 7879 UNF 700MB DJF 1979 DEV CON = 5.00*10^-1 SCALE = 1.000*10^0



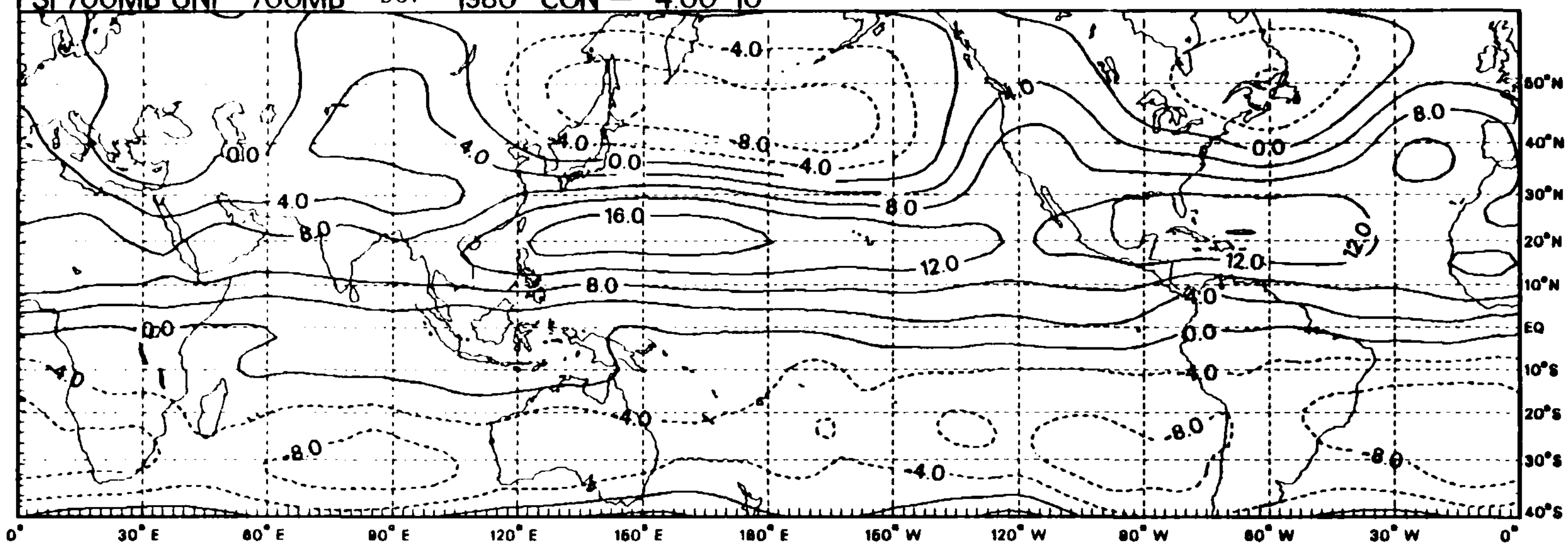
U,V 700MB UNF 700MB DJF 1980 CON = $5.00*10^0$ SCALE = $1.000*10^1$



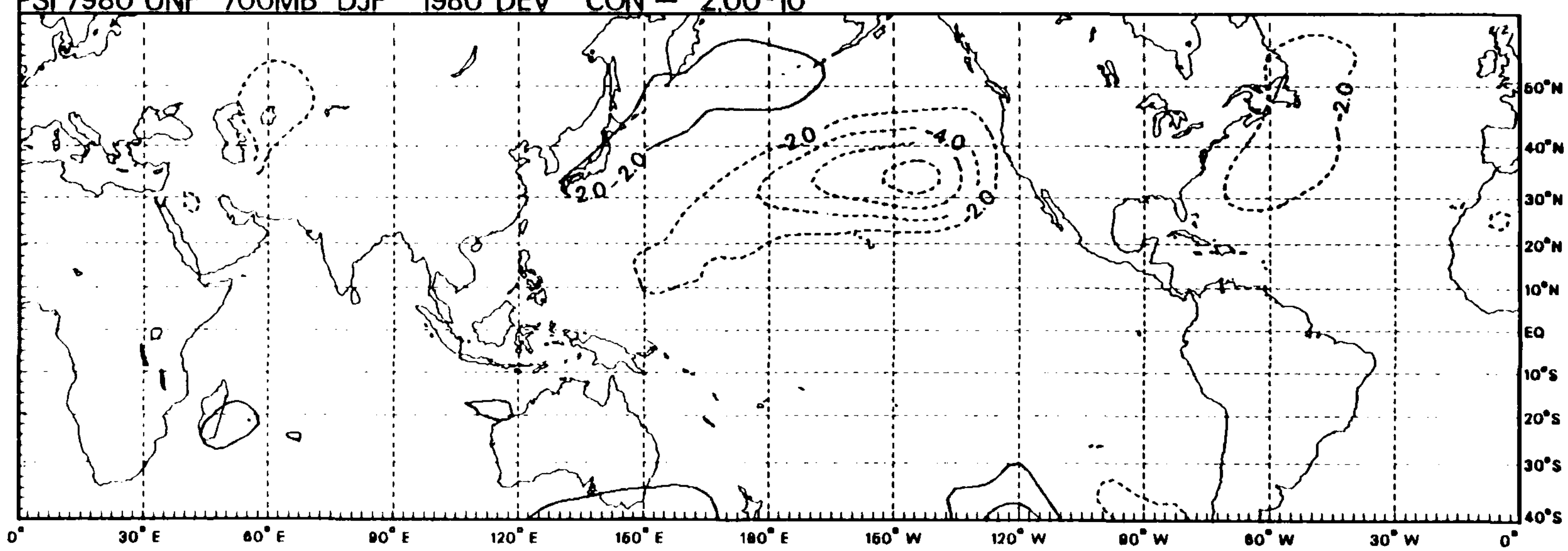

U,V 7980 UNF 700MB DJF 1980 DEV CON = $2.50*10^0$ SCALE = $5.000*10^0$



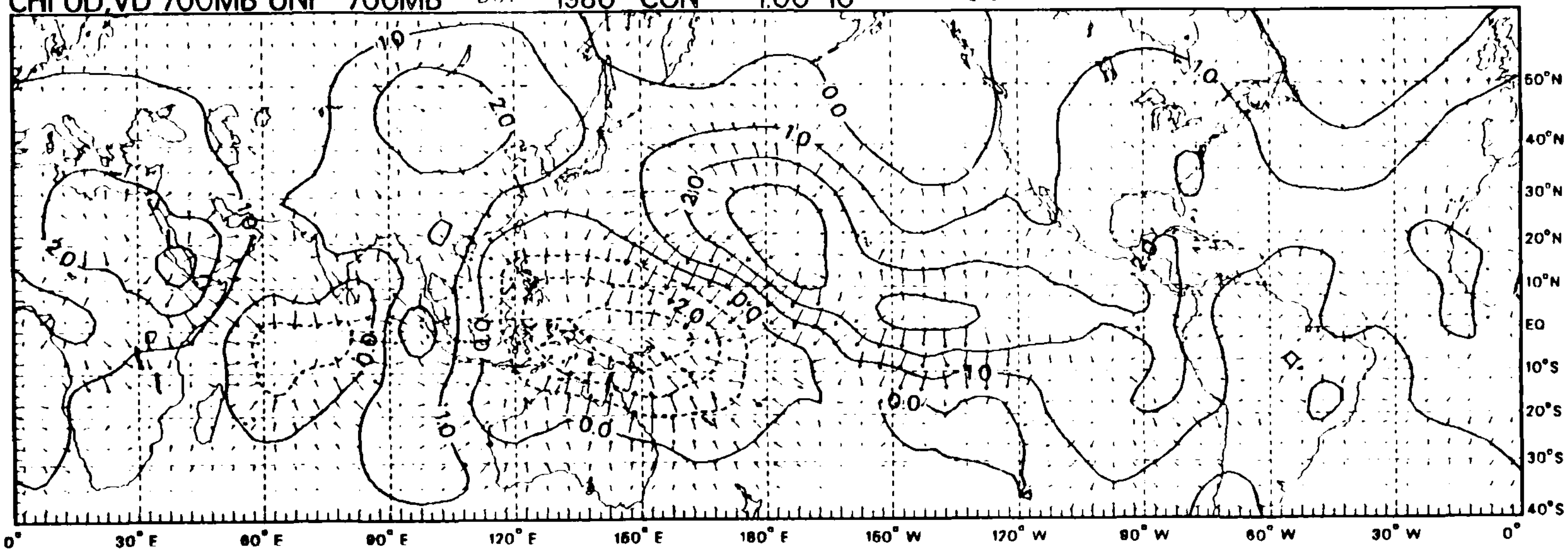
PSI 700MB UNF 700MB DJF 1980 CON = 4.00*10$^{0}$



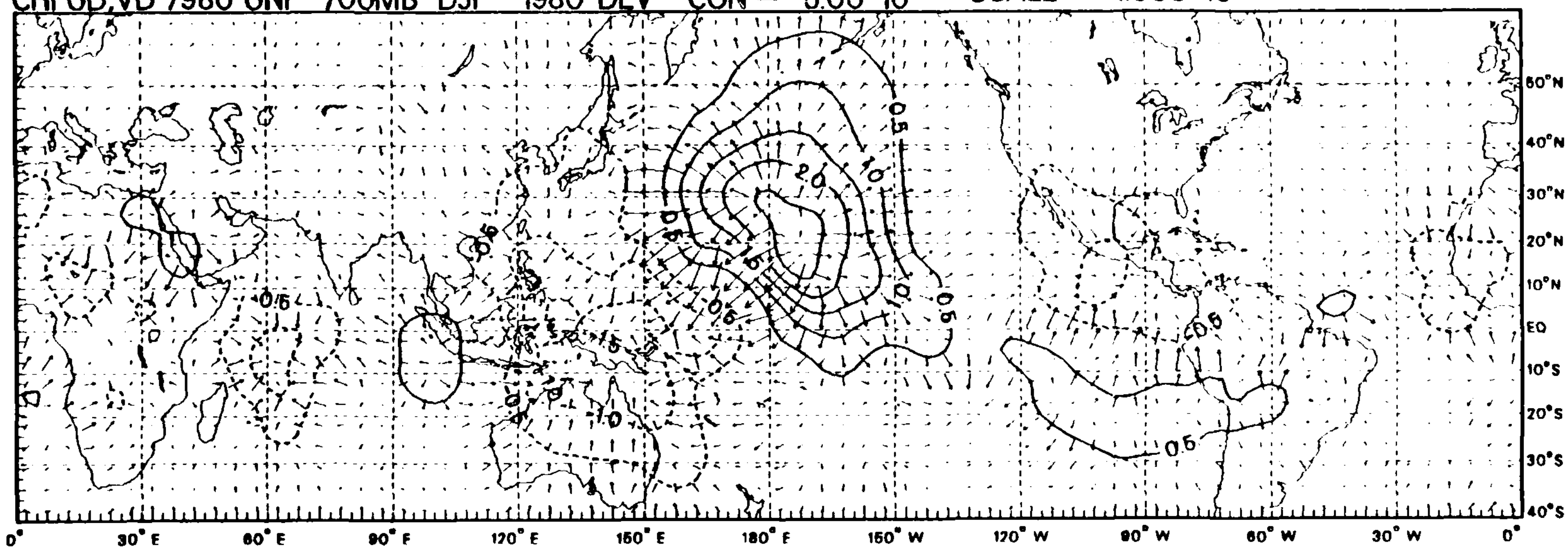

PSI 7980 UNF 700MB DJF 1980 DEV CON = 2.00*10$^{0}$



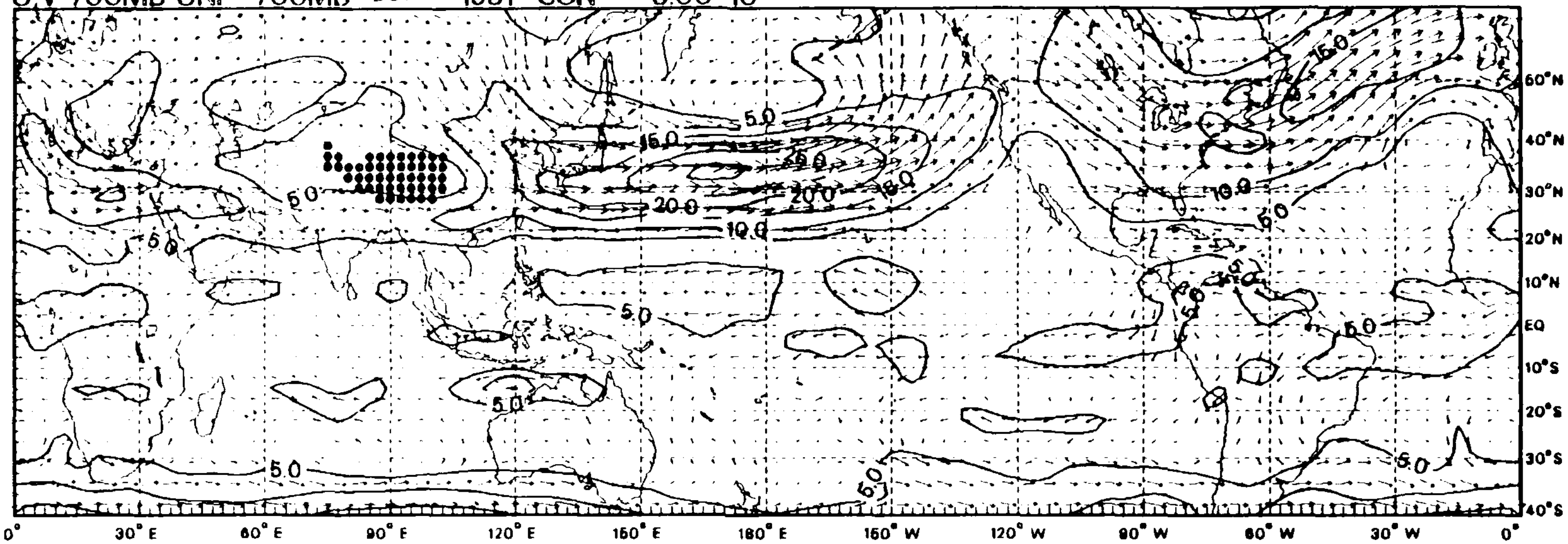
CHI UD,VD 700MB UNF 700MB DJF 1980 CON = 1.00*10^0 SCALE = 2.000*10^0



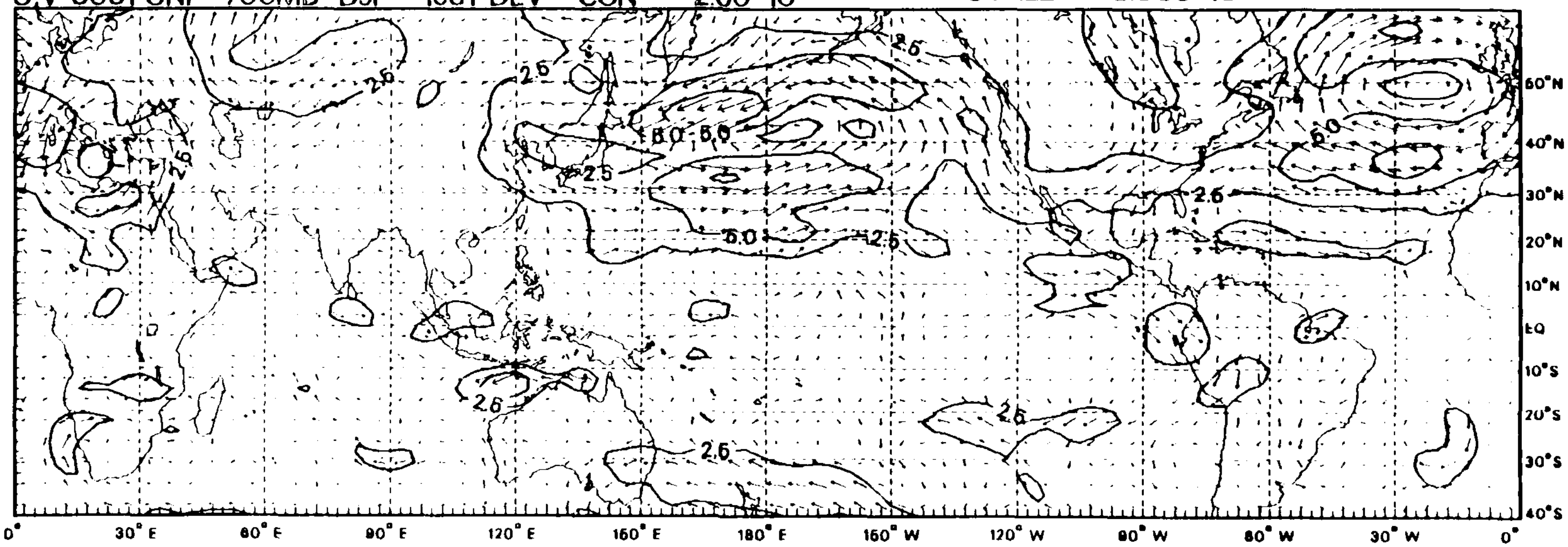

CHI UD,VD 7980 UNF 700MB DJF 1980 DEV CON = 5.00*10^-1 SCALE = 1.000*10^0



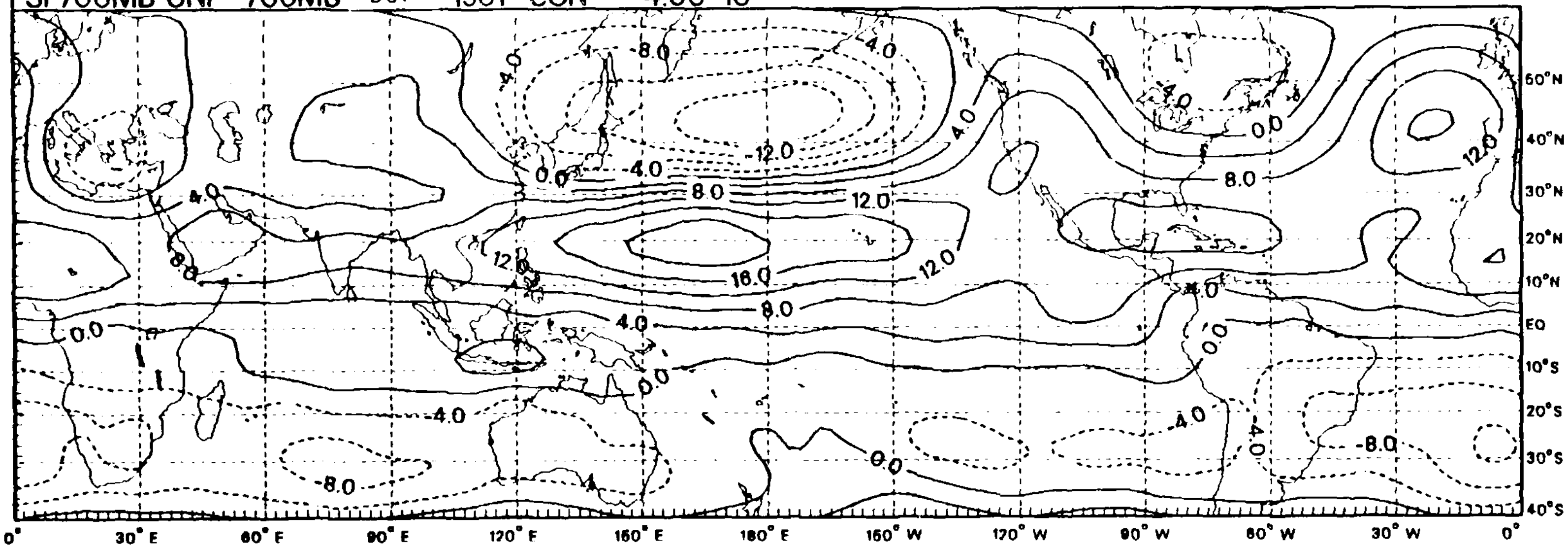
U,V 700MB UNF 700MB DJF 1981 CON = $5.00*10^0$ SCALE = $1.000*10^1$



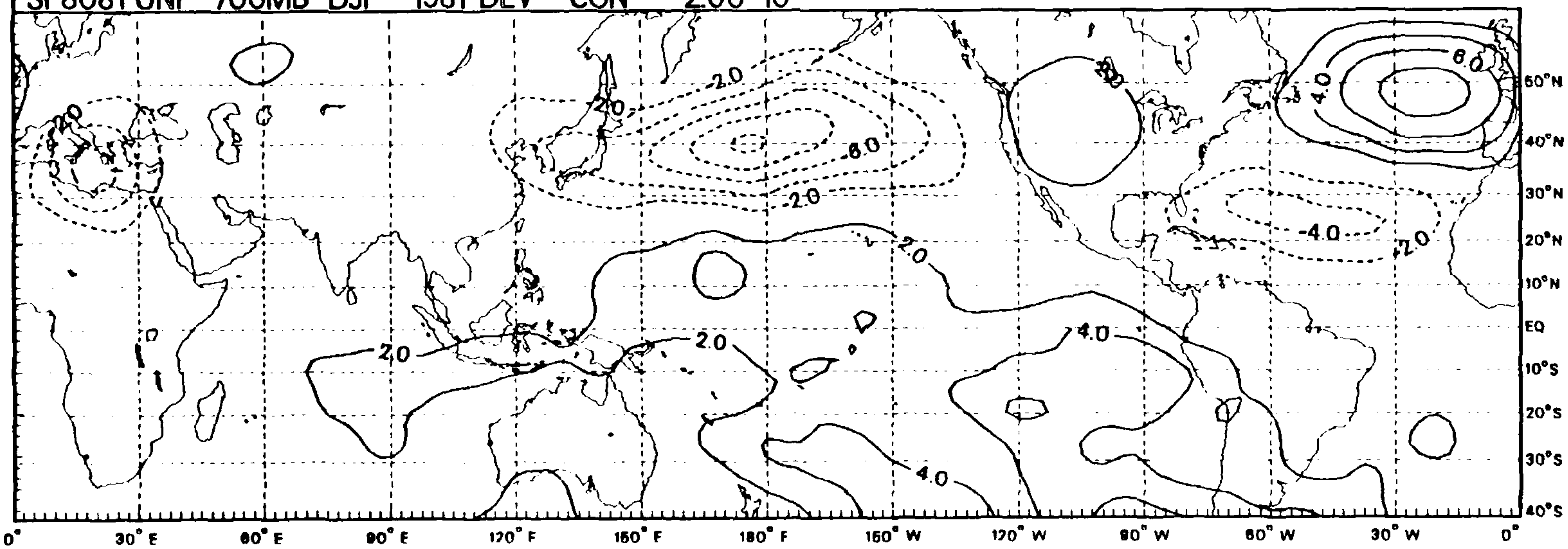

U,V 8081 UNF 700MB DJF 1981 DEV CON = $2.50*10^0$ SCALE = $5.000*10^0$



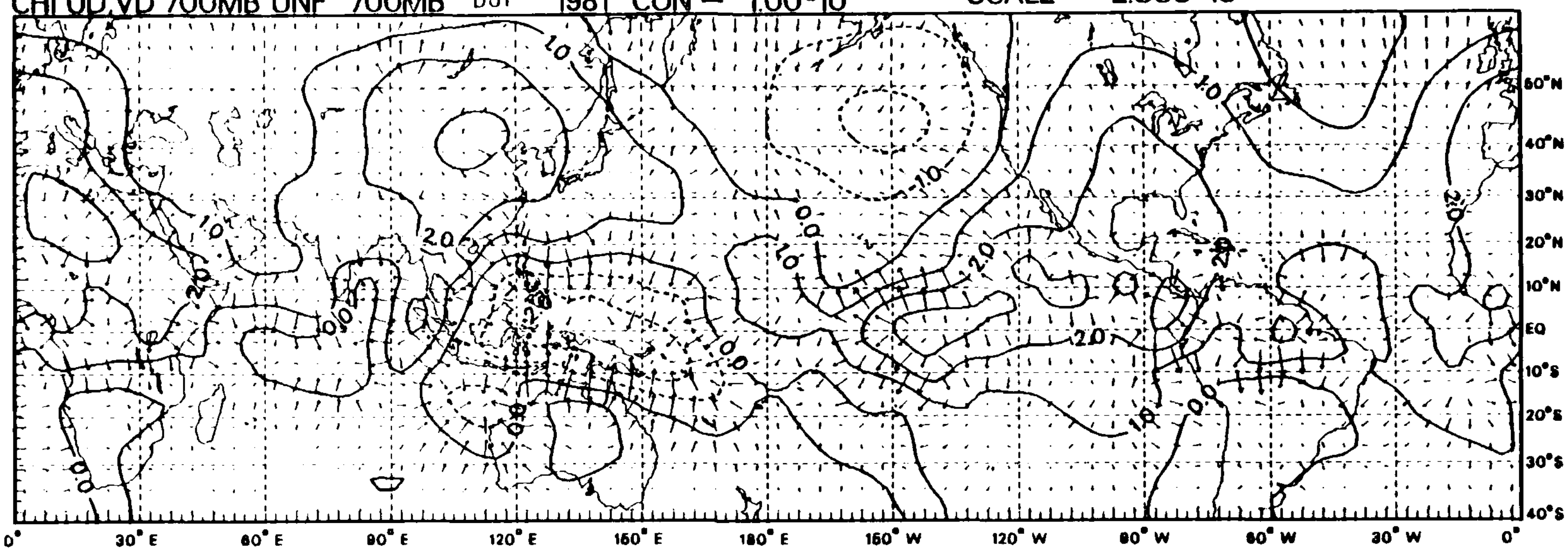
PSI 700MB UNF 700MB DJF 1981 CON = $4.00*10^{0}$



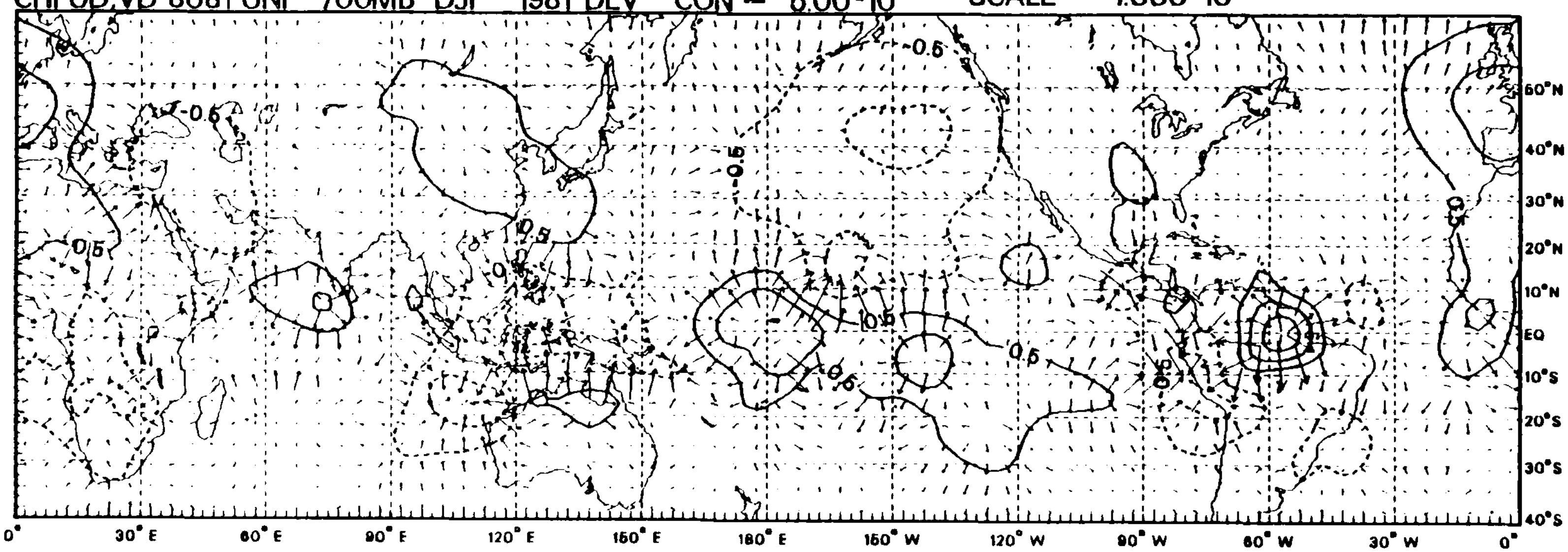

PSI 8081 UNF 700MB DJF 1981 DEV CON = $2.00*10^{0}$



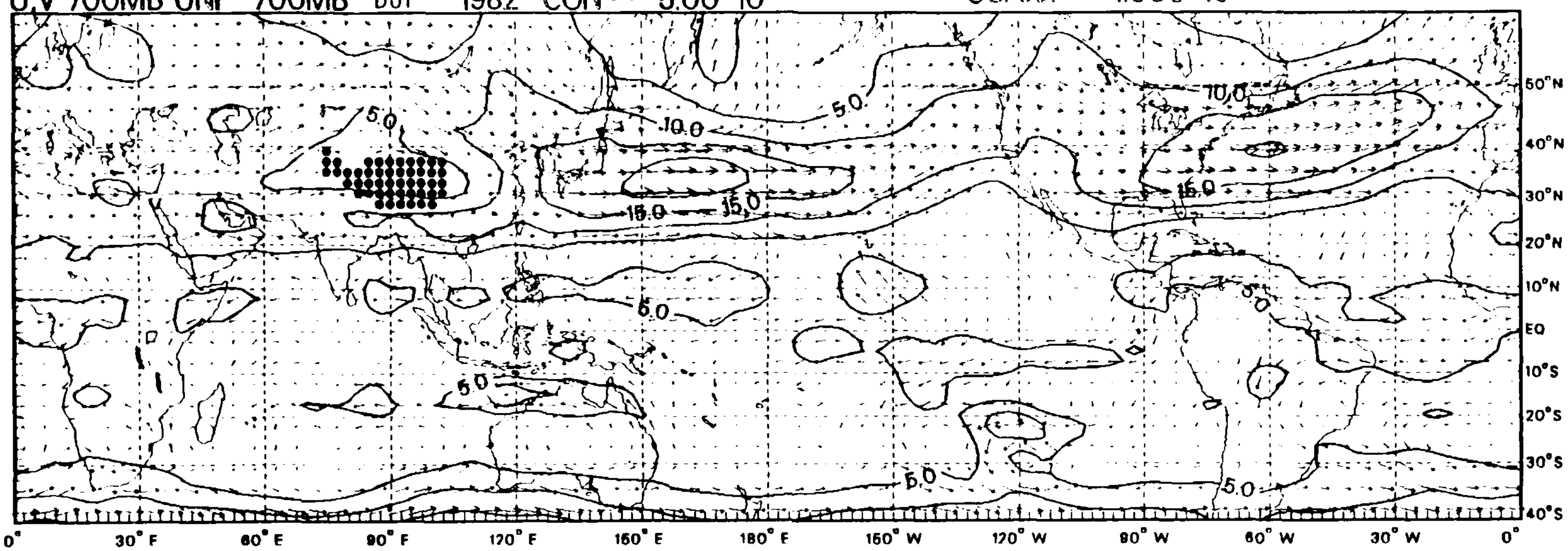
CHI UD,VD 700MB UNF 700MB DJF 1981 CON = $1.00*10^{0}$ SCALE = $2.000*10^{0}$



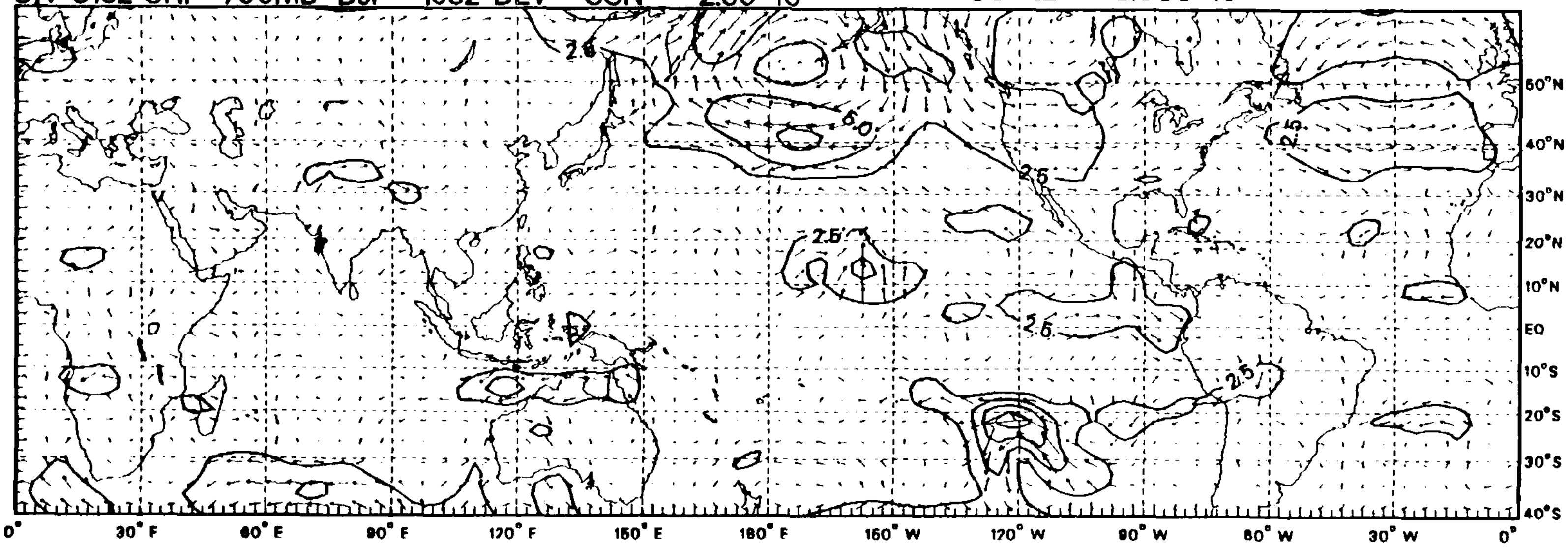

CHI UD,VD 8081 UNF 700MB DJF 1981 DEV CON = $6.00*10^{-1}$ SCALE = $1.000*10^{0}$



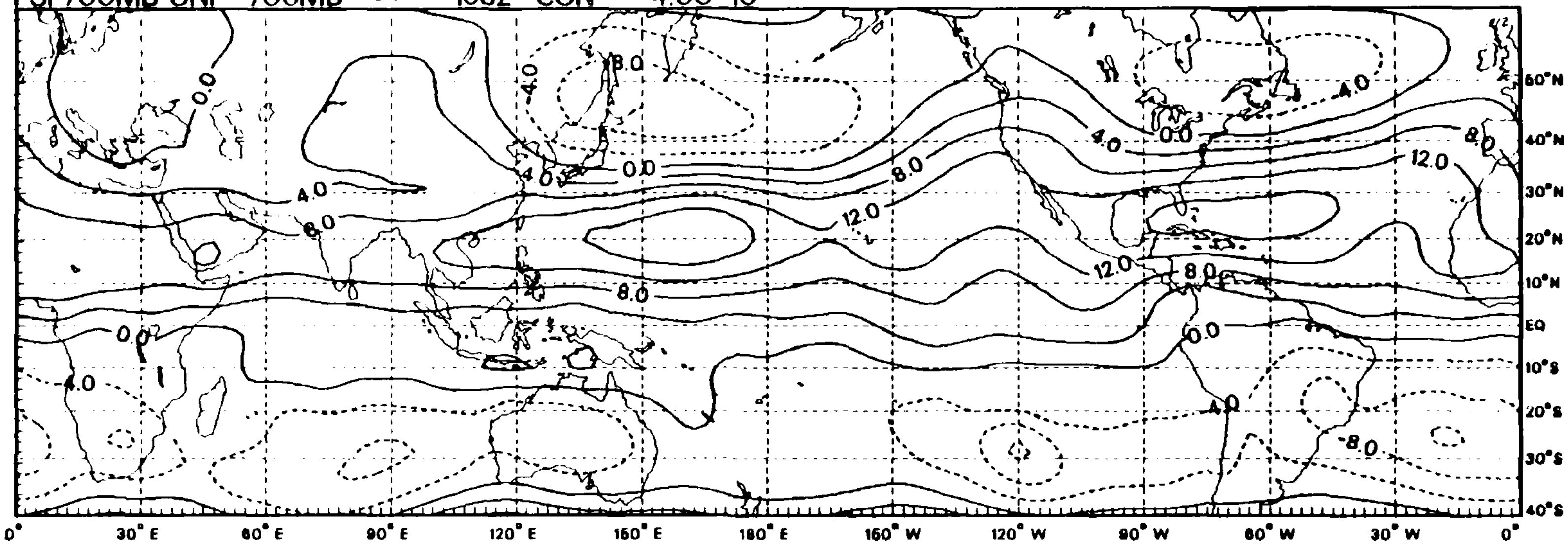
U,V 700MB UNF 700MB DJF 1982 CON = 5.00*10^0 SCALE = 1.000*10^1



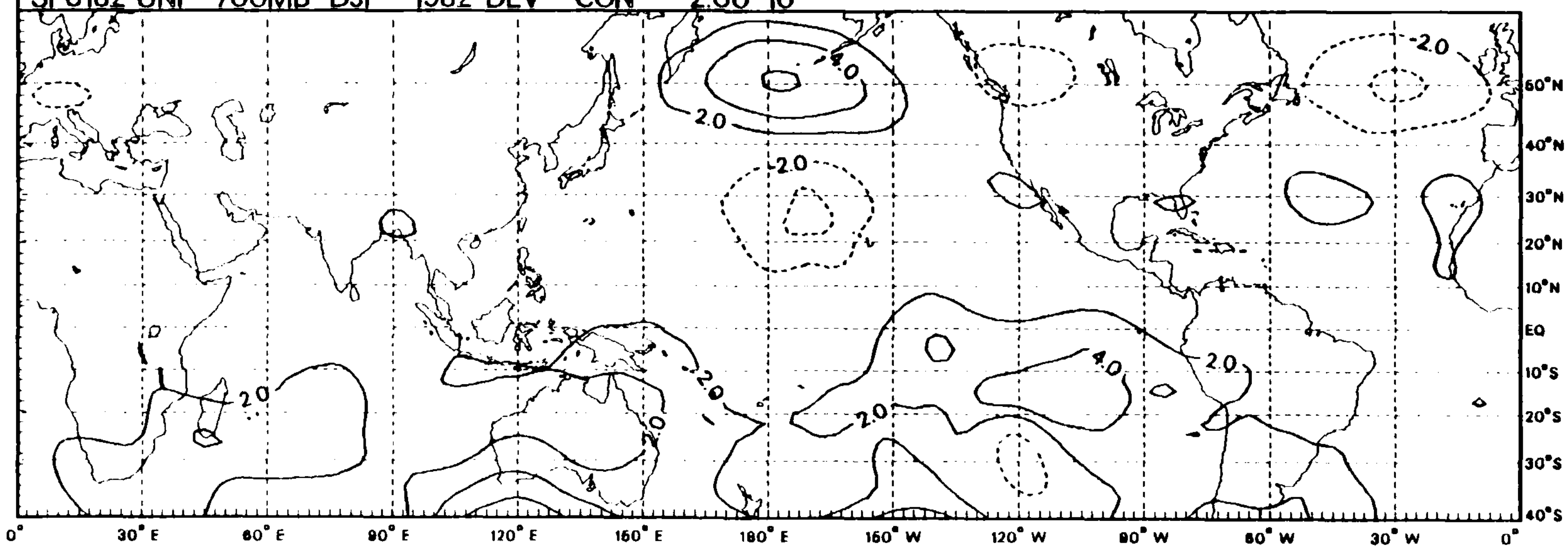

U,V 8182 UNF 700MB DJF 1982 DEV CON = 2.50*10^0 SCALE = 5.000*10^0

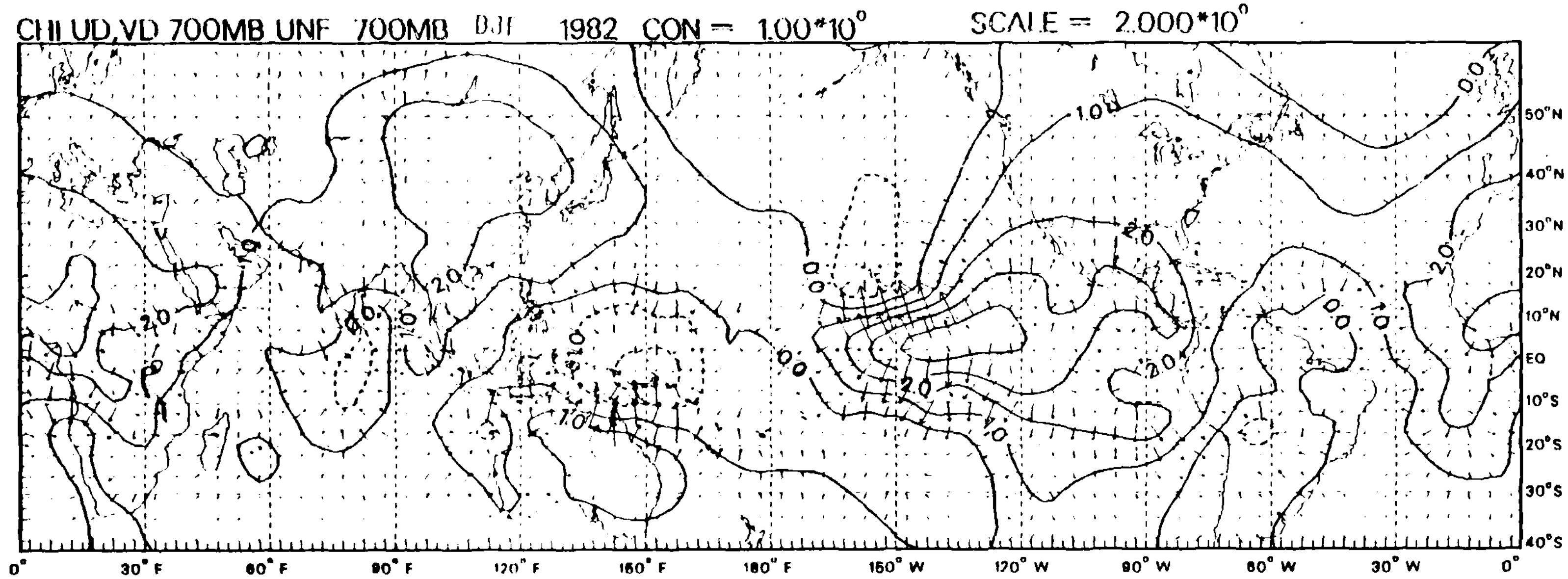


PSI 700MB UNF 700MB DJF 1982 CON = 4.00*10$^0$




PSI 8182 UNF 700MB DJF 1982 DEV CON = 2.00*10$^0$




CHI UD,VD 700MB UNF 700MB DJF 1982 CON = 1.00*10^0 SCALE = 2.000*10^0
50°N
40°N
30°N
20°N
10°N
EQ
10°S
20°S
30°S
40°S
0°
30° E
60° E
90° E
120° E
150° E
180° E
150° W
120° W
90° W
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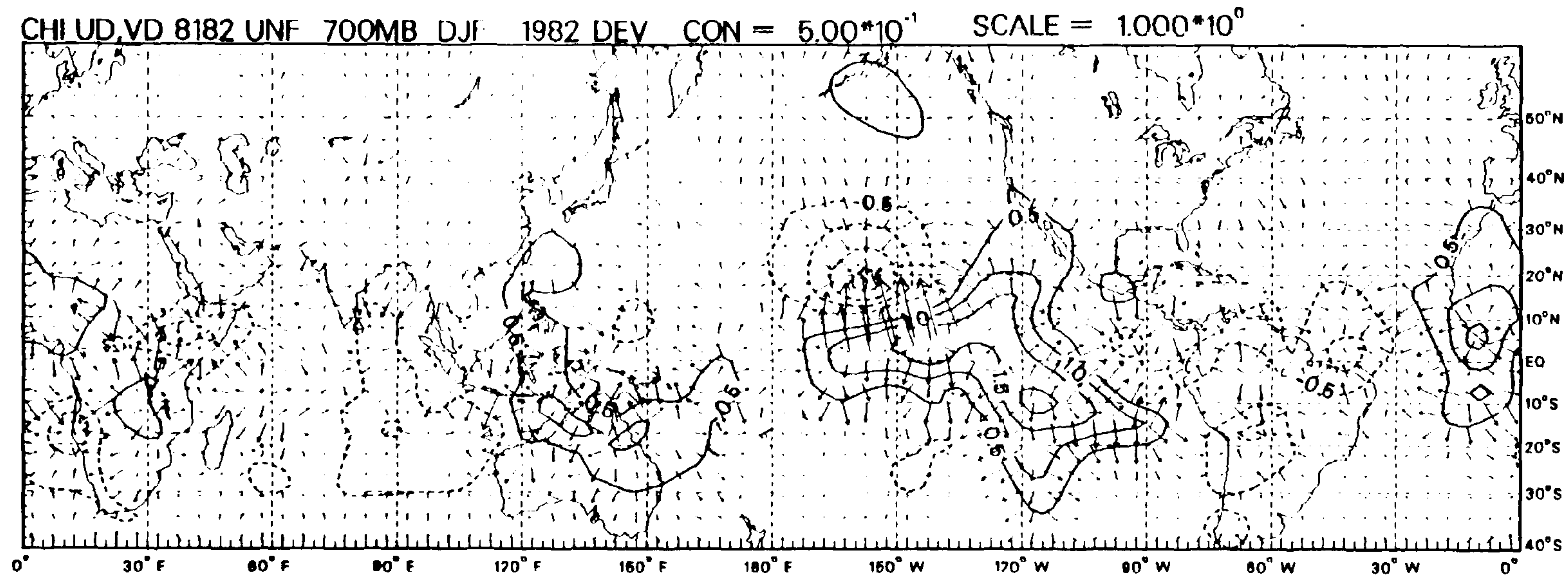
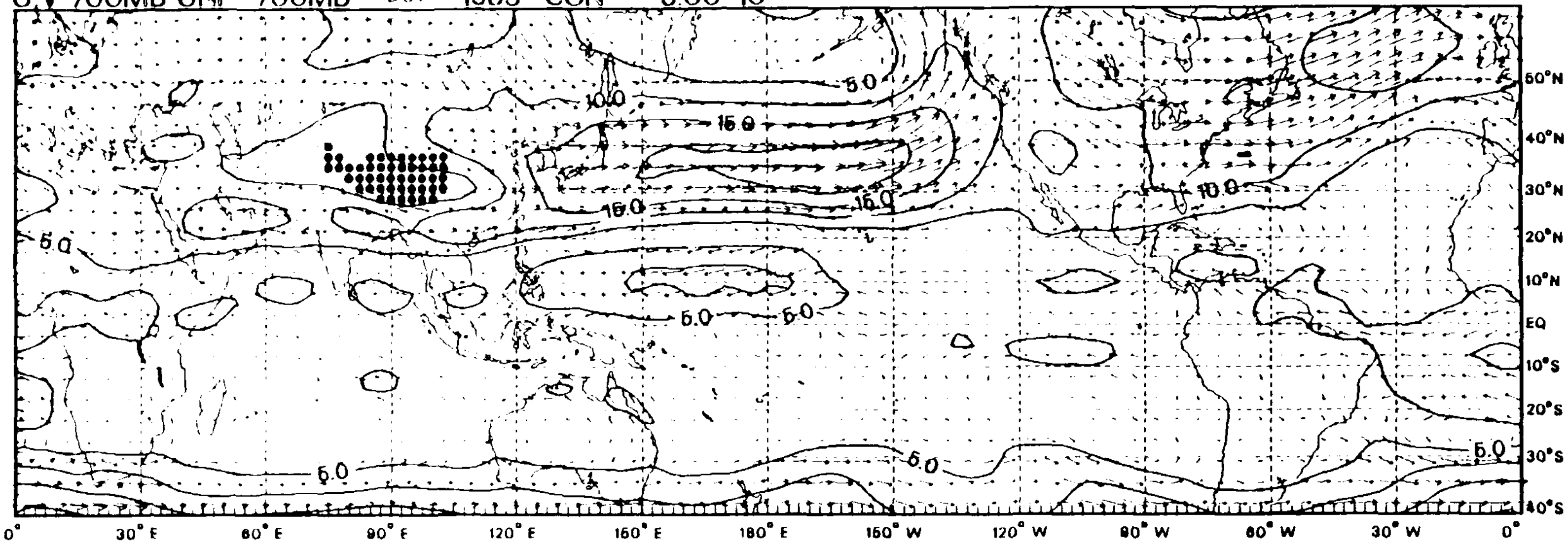
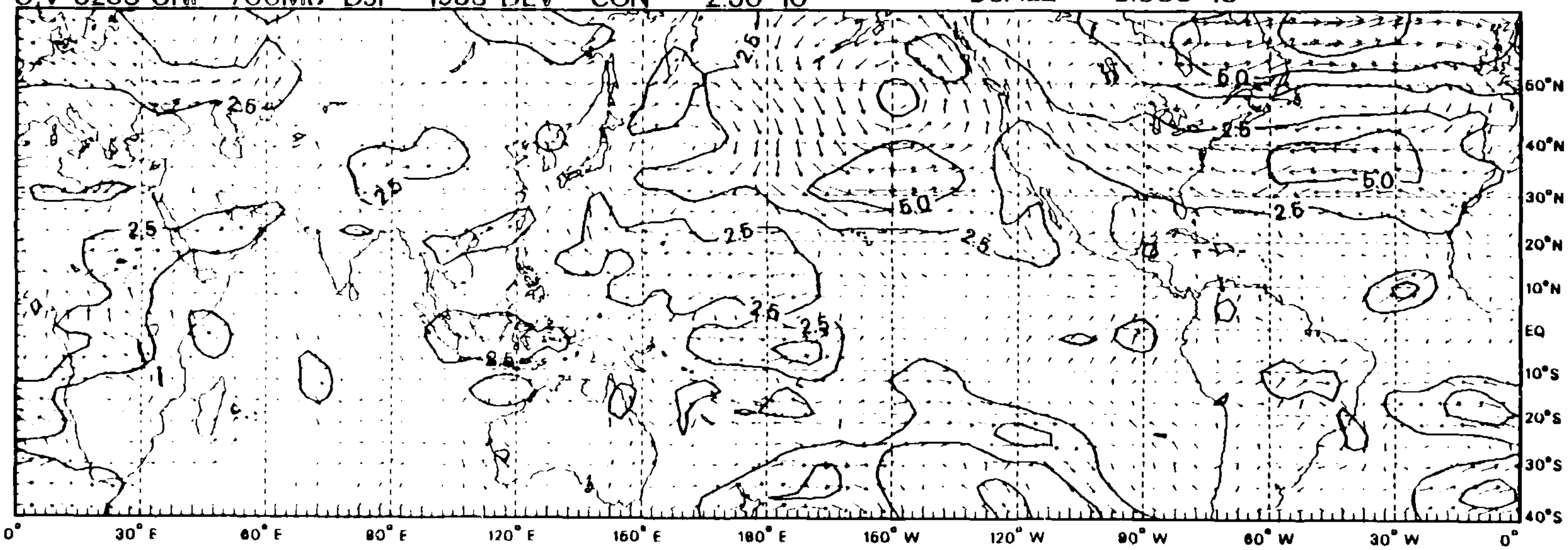
30° W
0°
0.0
1.0
2.0


CHI UD,VD 8182 UNF 700MB DJF 1982 DEV CON = 5.00*10^-1 SCALE = 1.000*10^0
50°N
40°N
30°N
20°N
10°N
EQ
10°S
20°S
30°S
40°S
0°
30° E
60° E
90° E
120° E
150° E
180° E
150° W
120° W
90° W
60° W
30° W
0°
-0.5
0.5
1.0
1.5

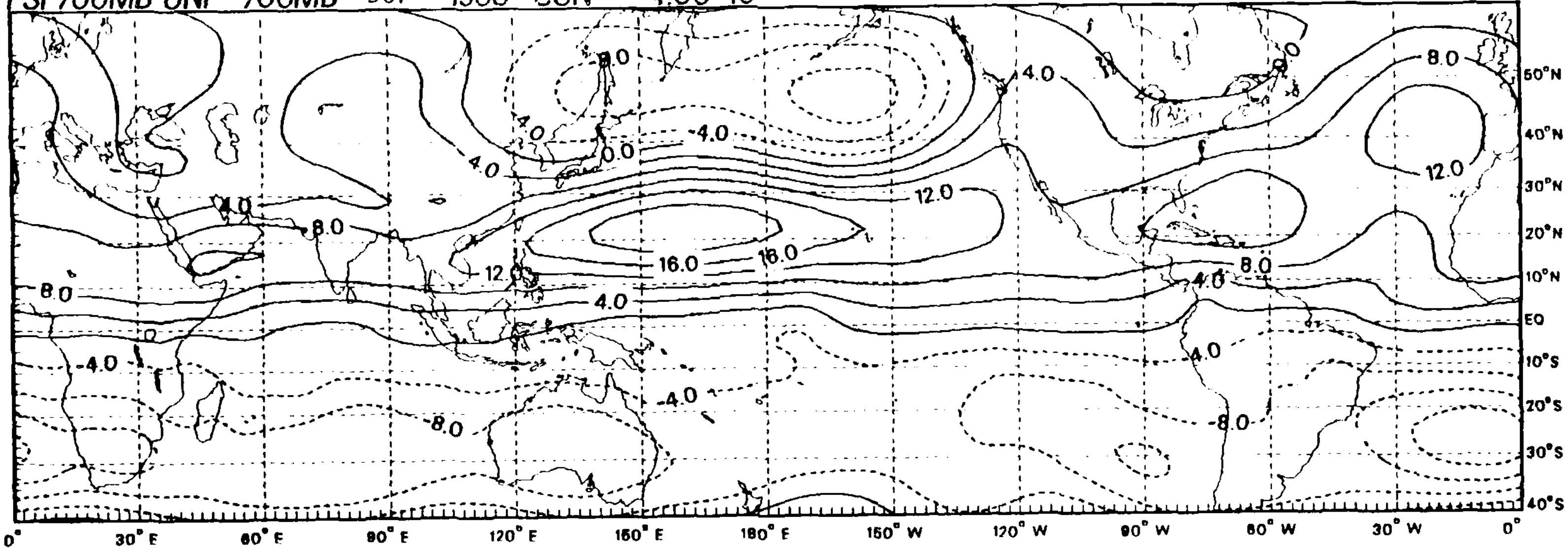
U,V 700MB UNF 700MB DJF 1983 CON = $5.00*10^0$ SCALE = $1.000*10^1$



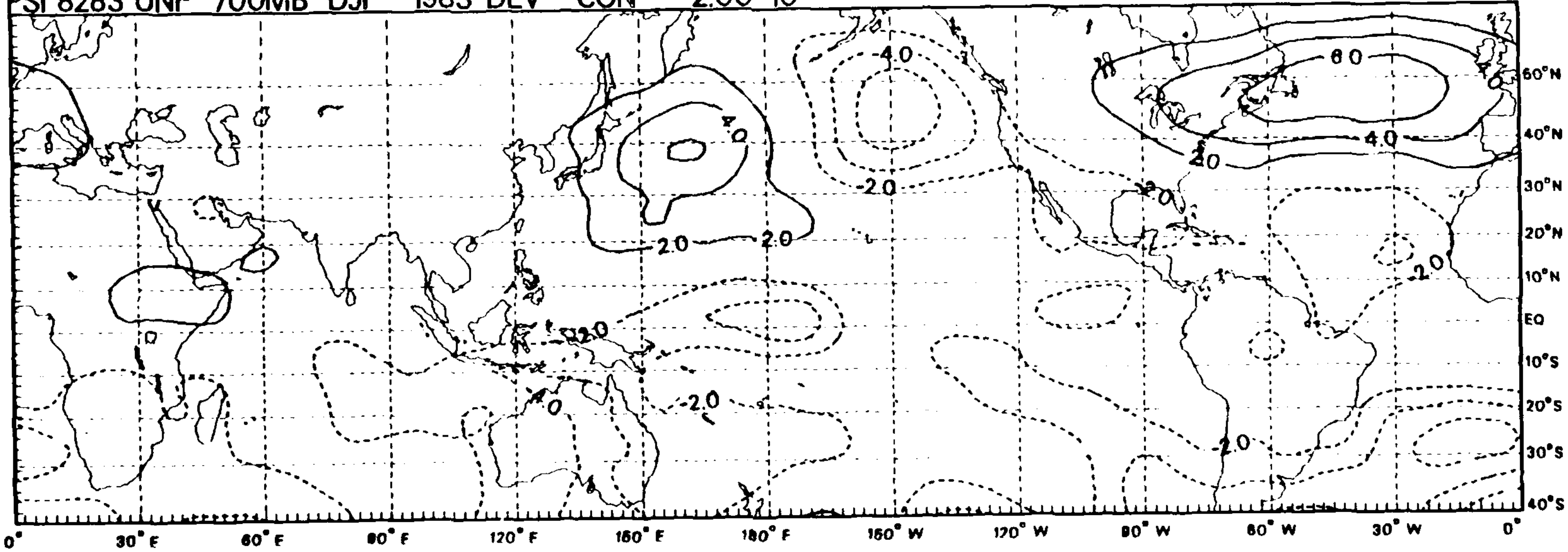

U,V 8283 UNF 700MB DJF 1983 DEV CON = $2.50*10^0$ SCALE = $5.000*10^0$



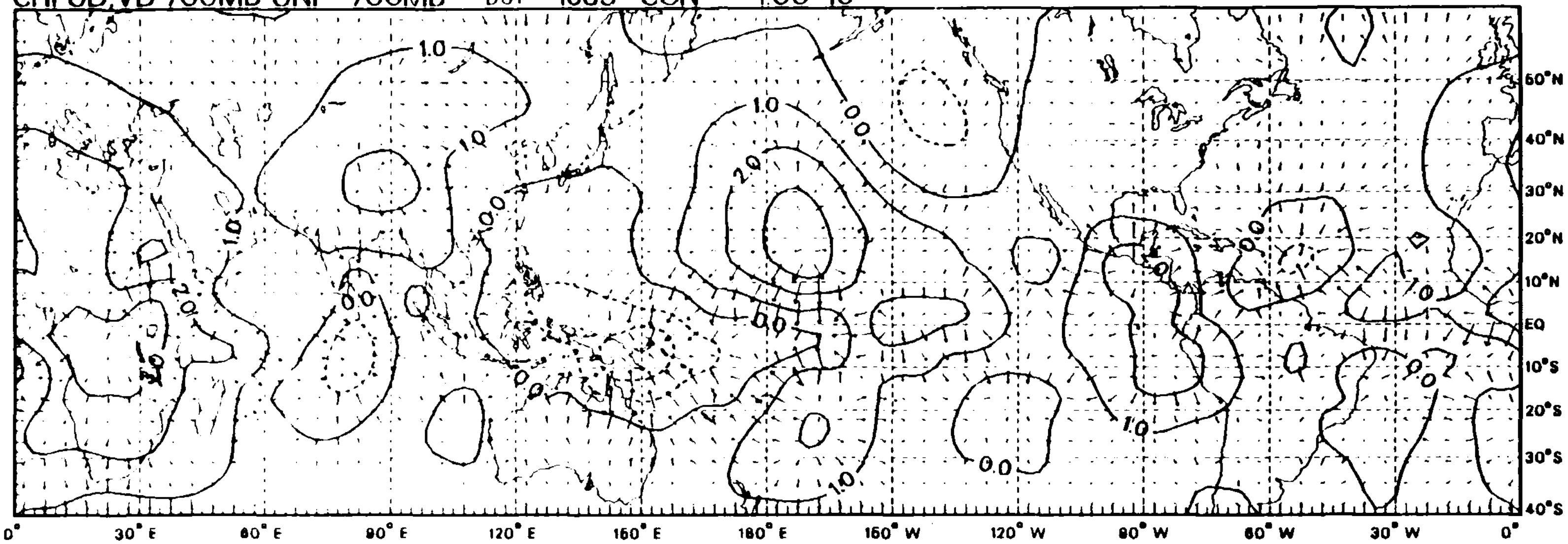
PSI 700MB UNF 700MB DJF 1983 CON = 4.00*10⁰



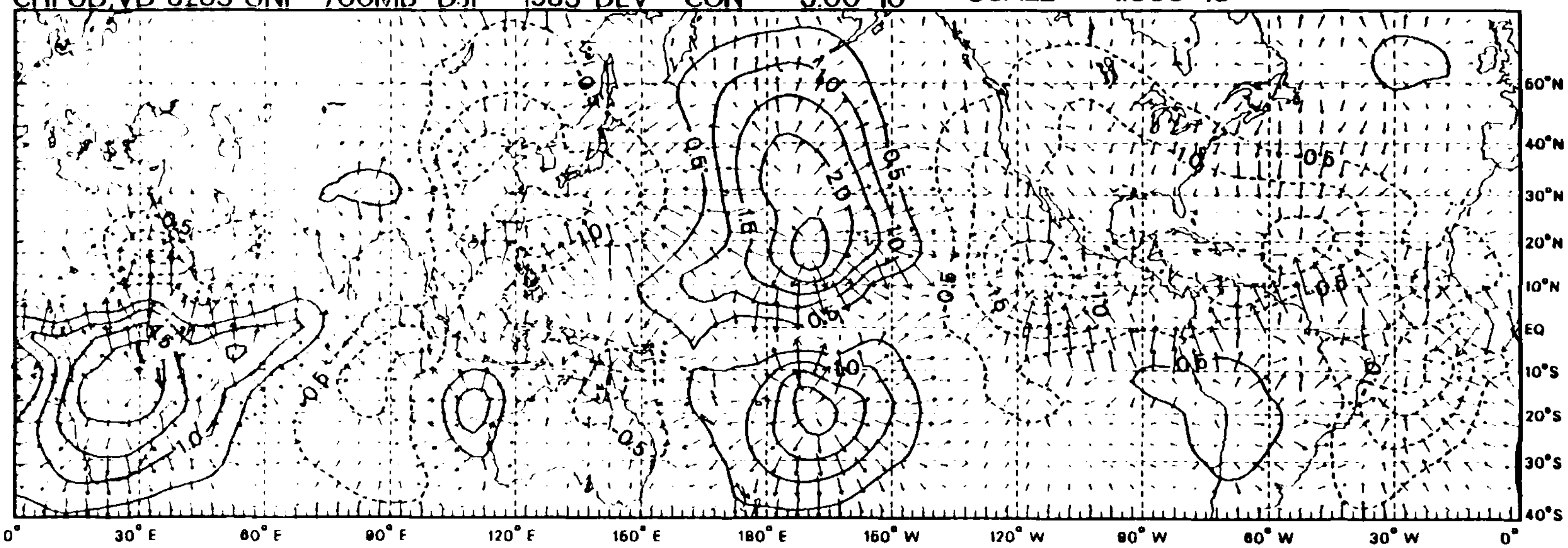

PSI 8283 UNF 700MB DJF 1983 DEV CON = 2.00*10⁰



CHI UD,VD 700MB UNF 700MB DJF 1983 CON = 1.00*10⁰ SCALE = 2.000*10⁰

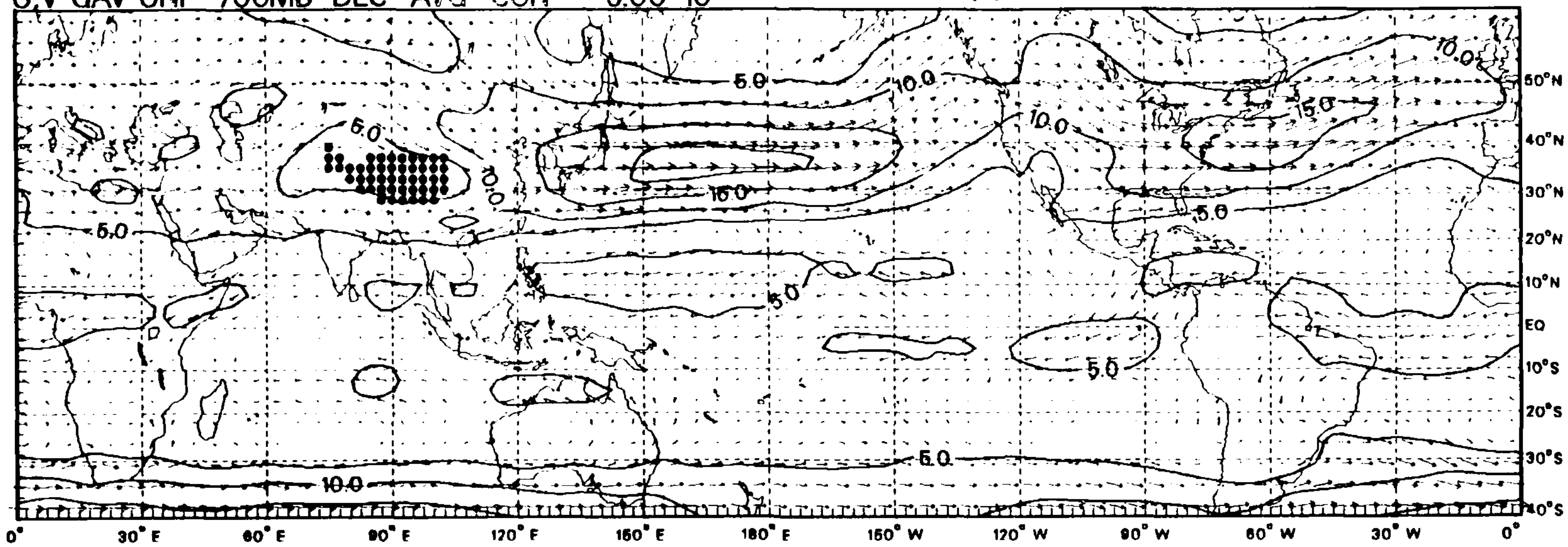



CHI UD,VD 8283 UNF 700MB DJF 1983 DEV CON = 5.00*10⁻¹ SCALE = 1.000*10⁰



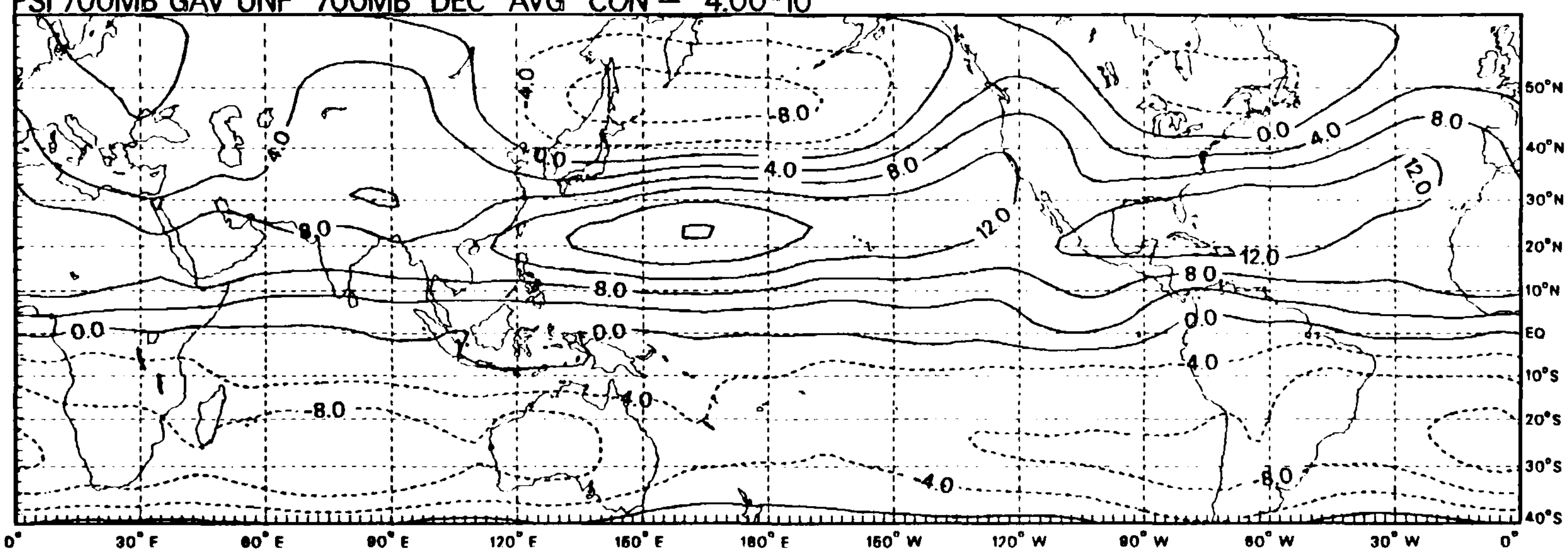
C1

U,V GAV UNF 700MB DEC AVG CON = 5.00*10$^{0}$ SCALE = 1.000*10$^{1}$



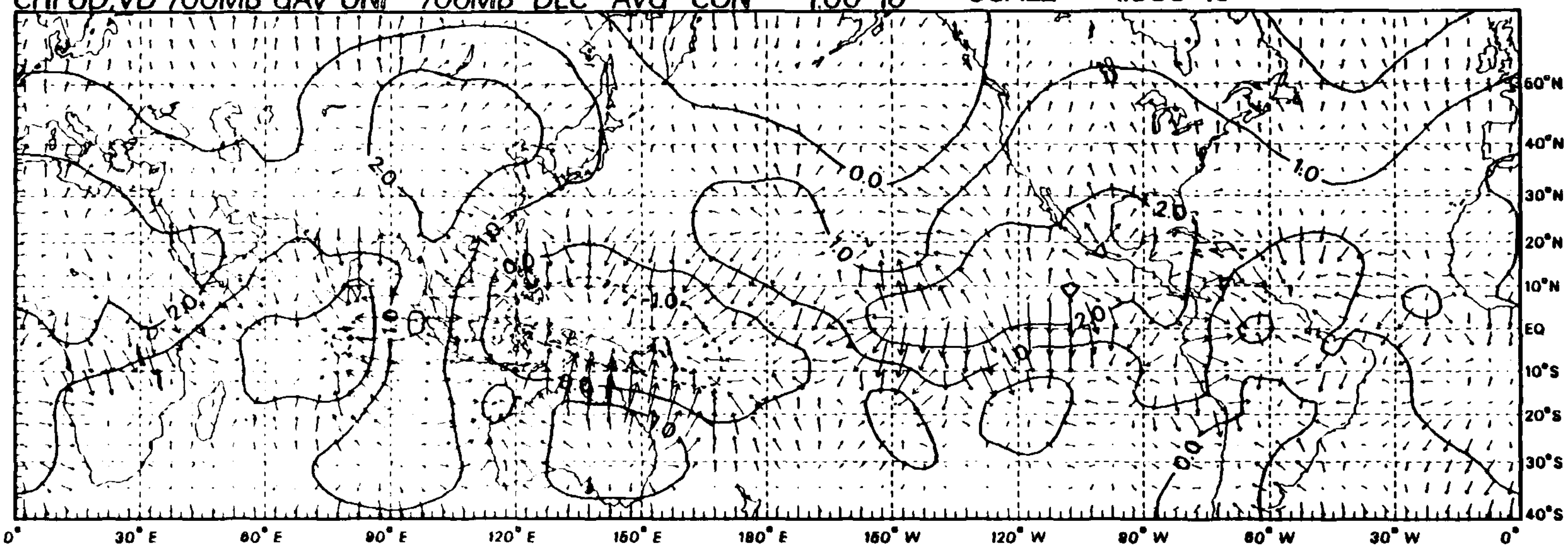

C2

PSI 700MB GAV UNF 700MB DEC AVG CON = 4.00*10$^{0}$

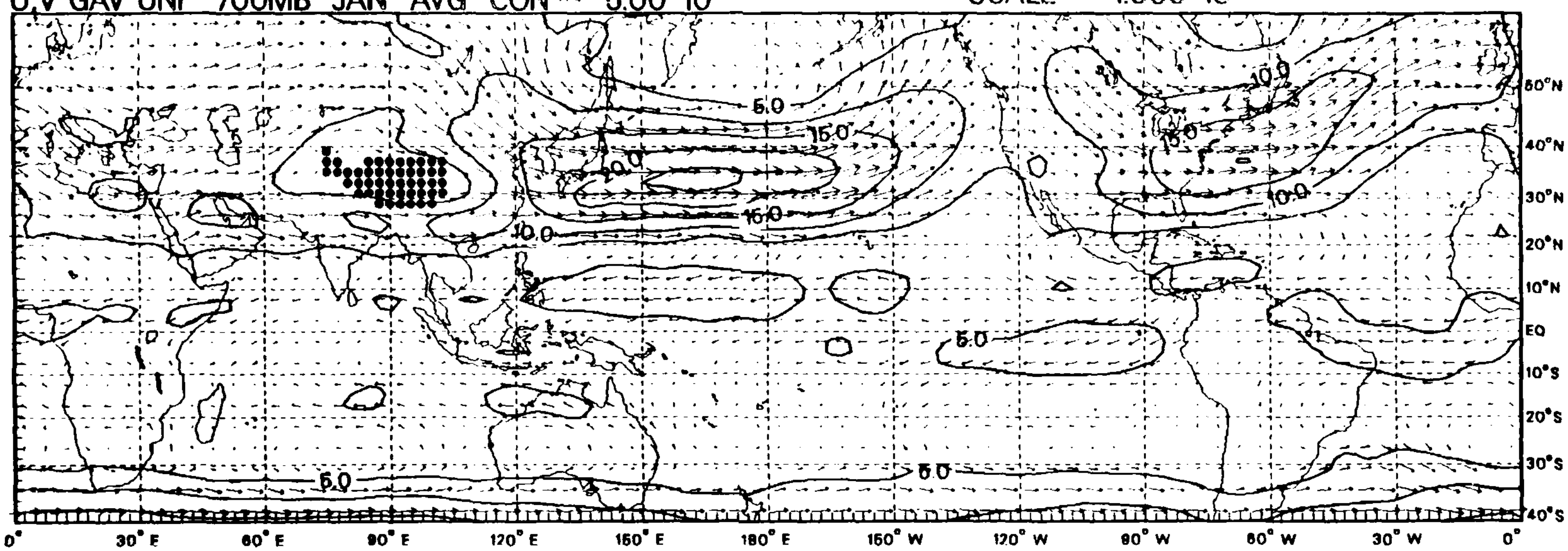


C3

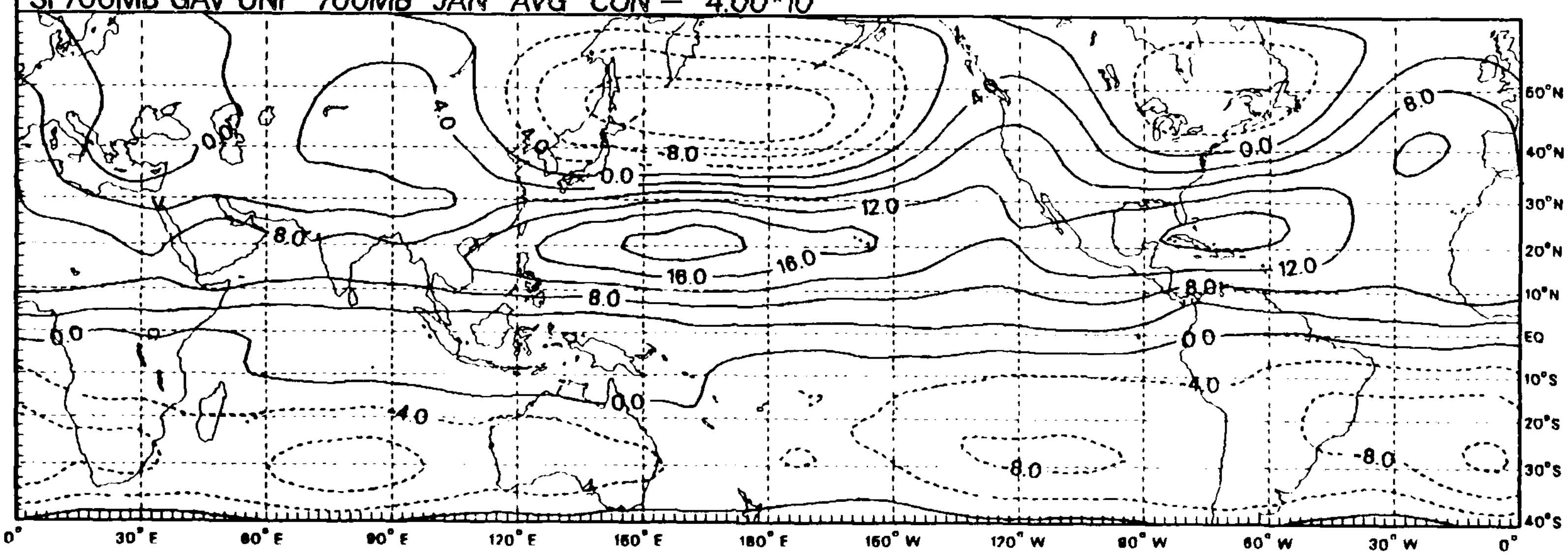
CHI UD,VD 700MB GAV UNF 700MB DEC AVG CON = $1.00*10^0$ SCALE = $1.000*10^0$ —



U,V GAV UNF 700MB JAN AVG CON = 5.00*10$^{0}$ SCALE = 1.000*10$^{1}$ C4

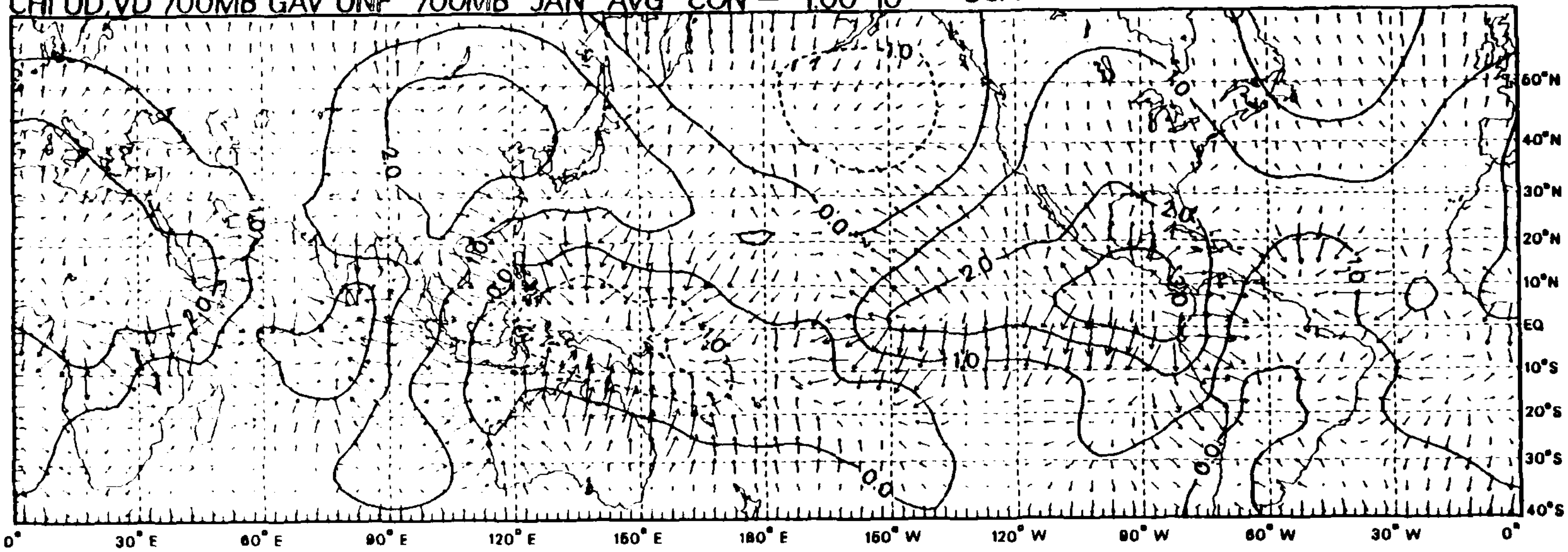



PSI 700MB GAV UNF 700MB JAN AVG CON = 4.00*10$^{0}$ C5



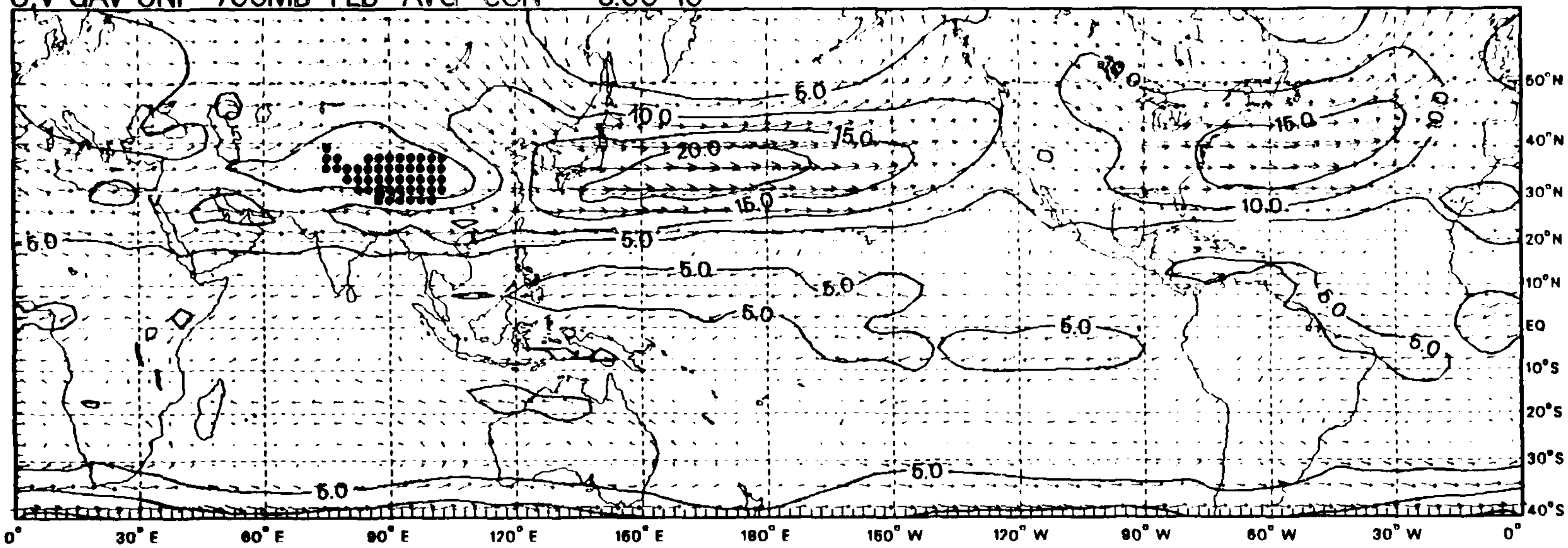
C6

CHI UD,VD 700MB GAV UNF 700MB JAN AVG CON = $1.00*10^0$ SCALE = $1.000*10^0$



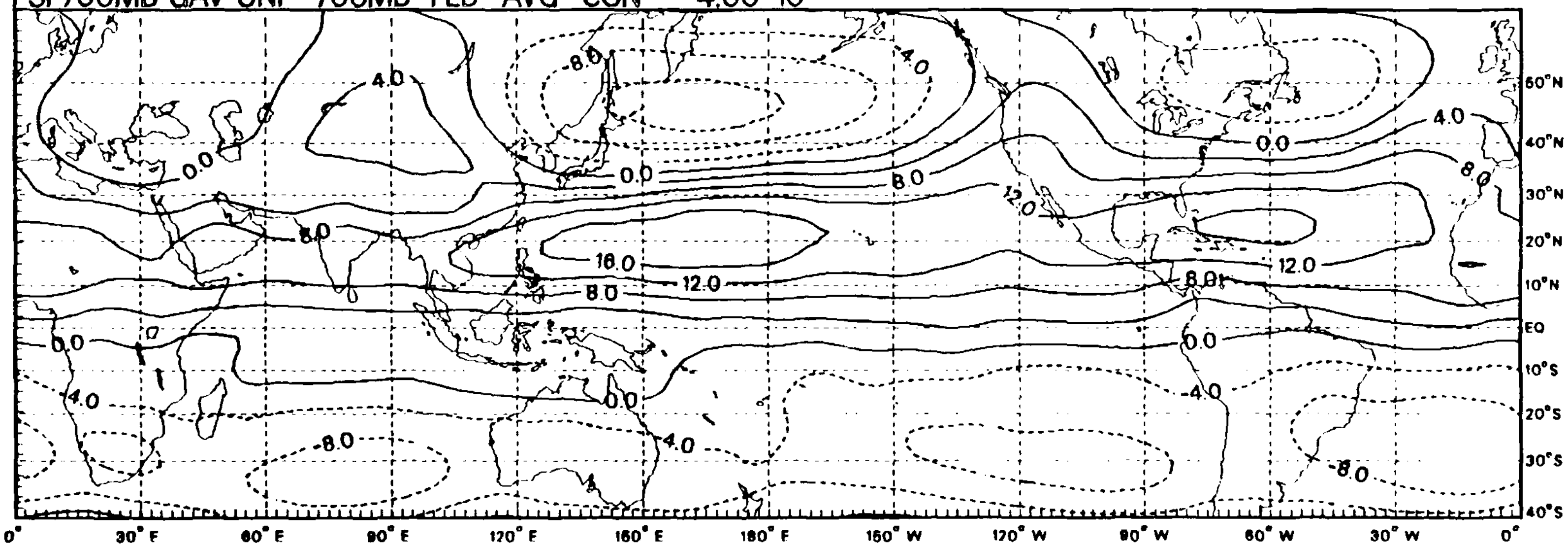
C7

U,V GAV UNF 700MB FEB AVG CON = 5.00*10^0    SCALE = 1.000*10^1



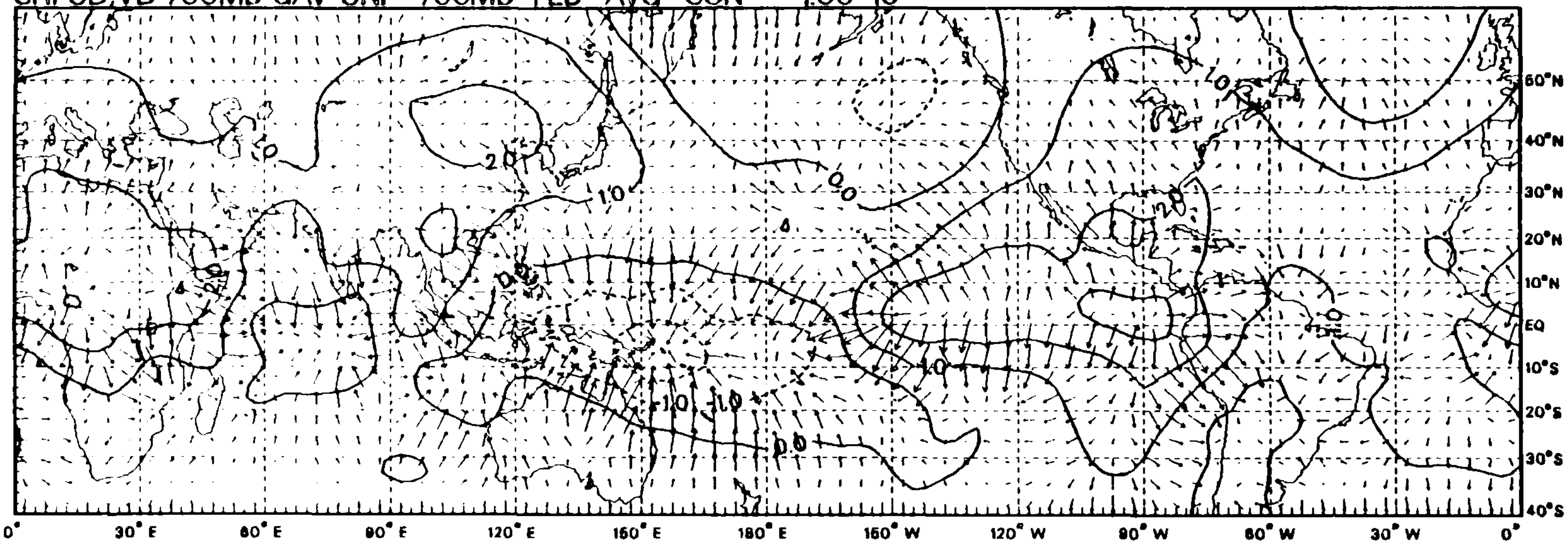

C8

PSI 700MB GAV UNF 700MB FEB AVG CON = 4.00*10^0

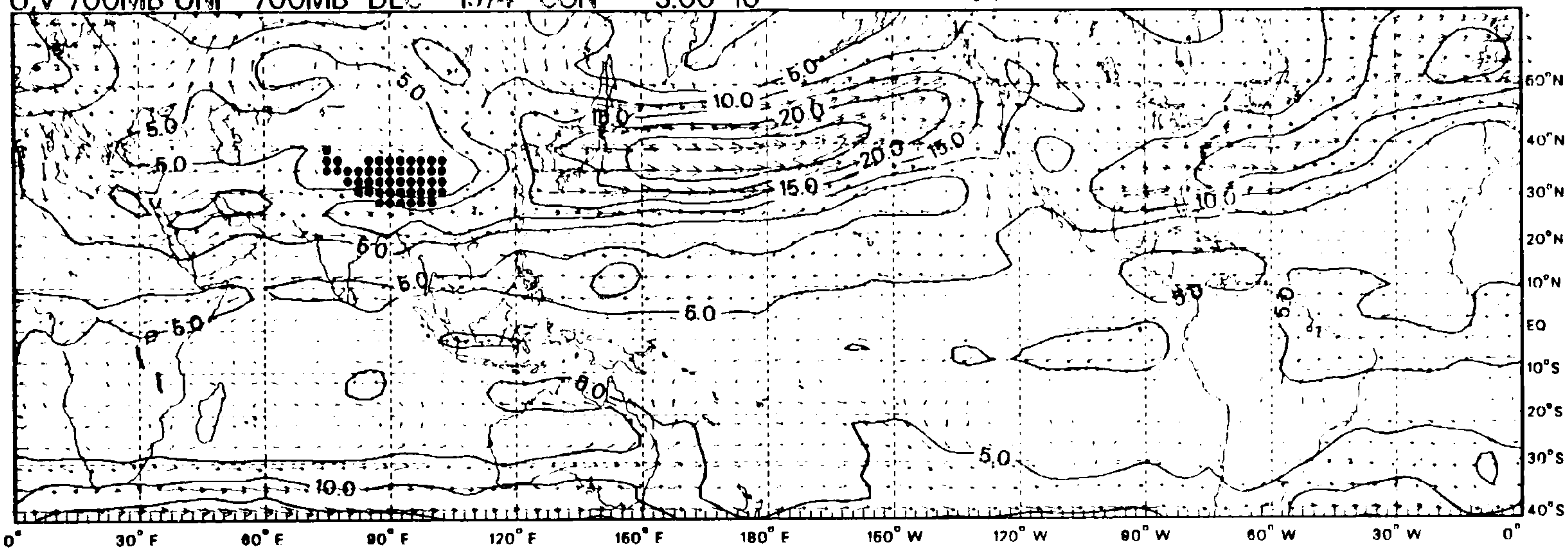


C9

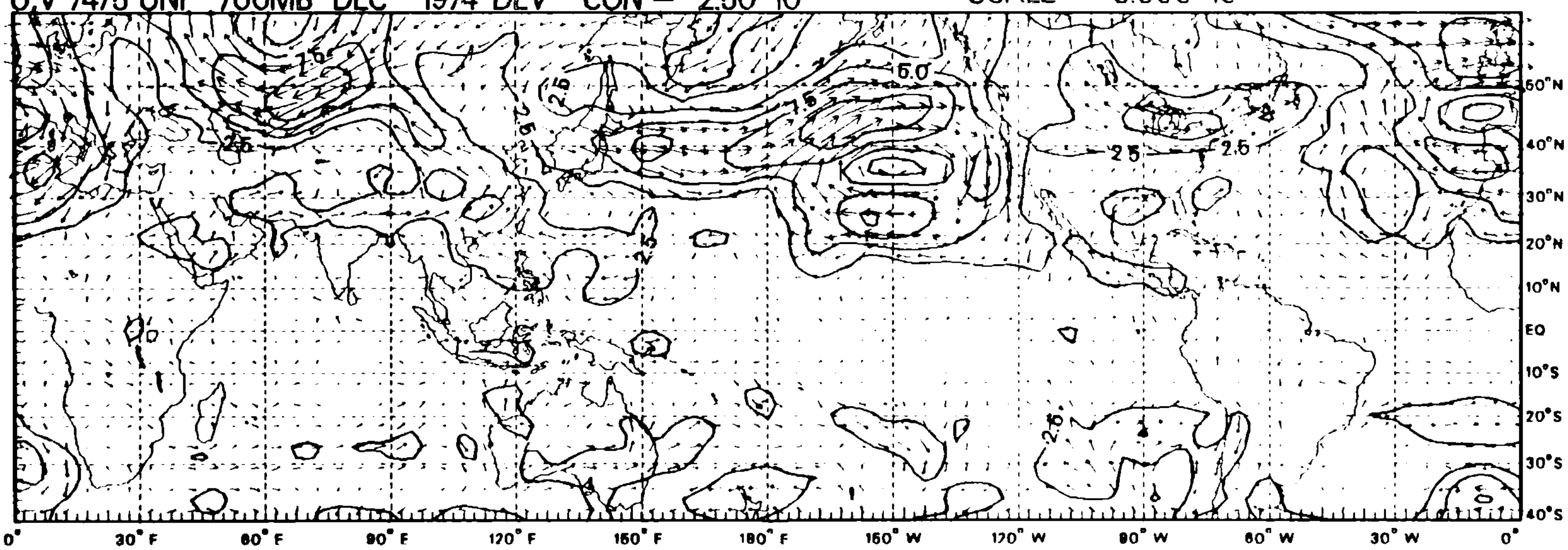
CHI UD,VD 700MB GAV UNF 700MB FEB AVG CON = $1.00*10^0$ SCALE = $1.000*10^0$



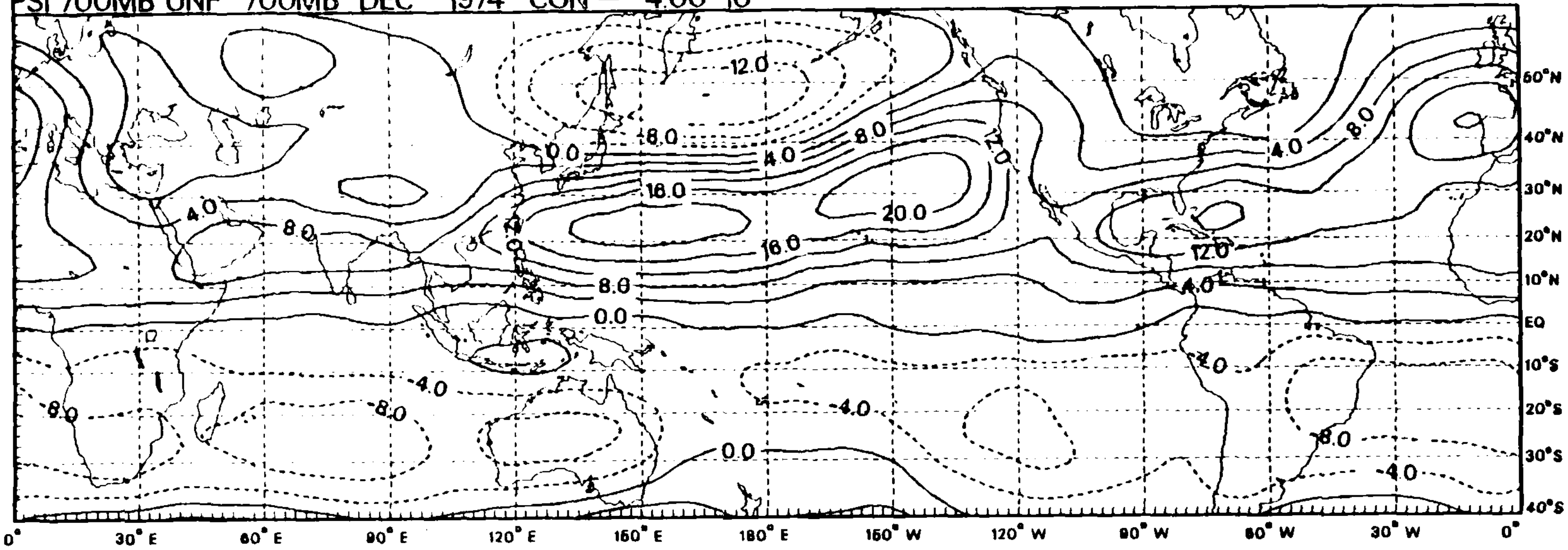
U,V 700MB UNF 700MB DEC 1974 CON = $5.00*10^0$ SCALE = $1.000*10^1$



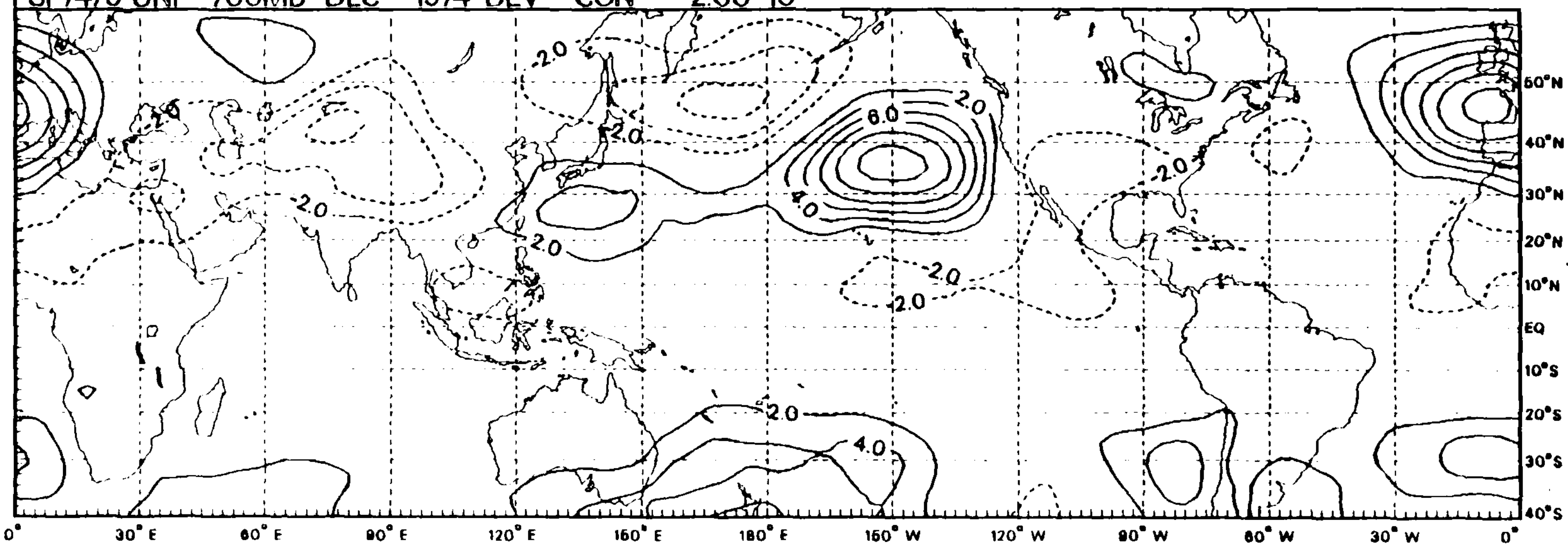

U,V 7475 UNF 700MB DEC 1974 DEV CON = $2.50*10^0$ SCALE = $5.000*10^0$

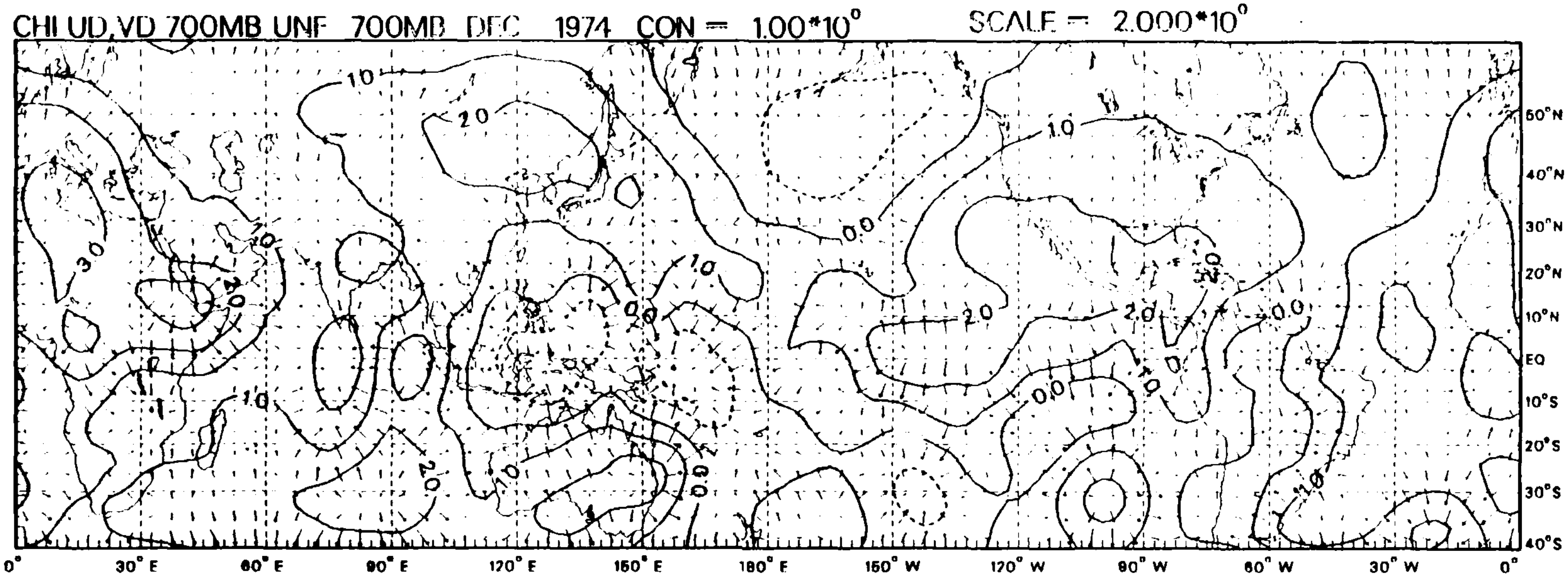


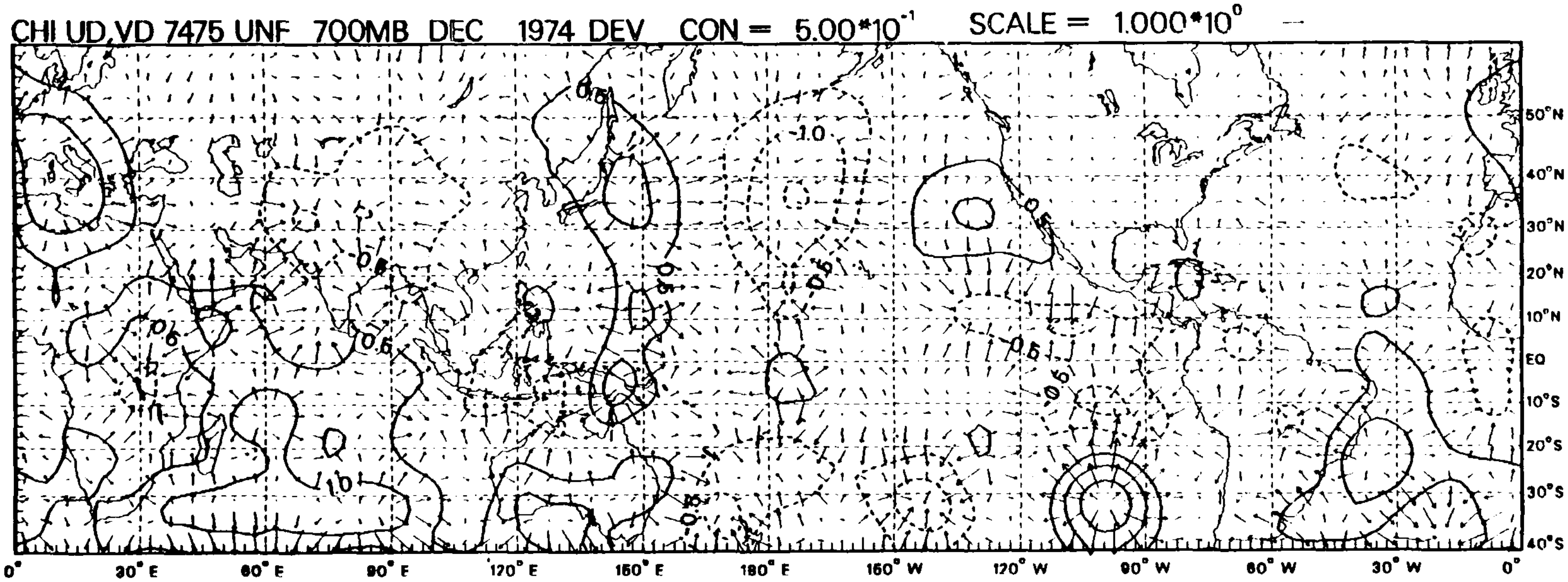
PSI 700MB UNF 700MB DEC 1974 CON = $4.00*10^0$



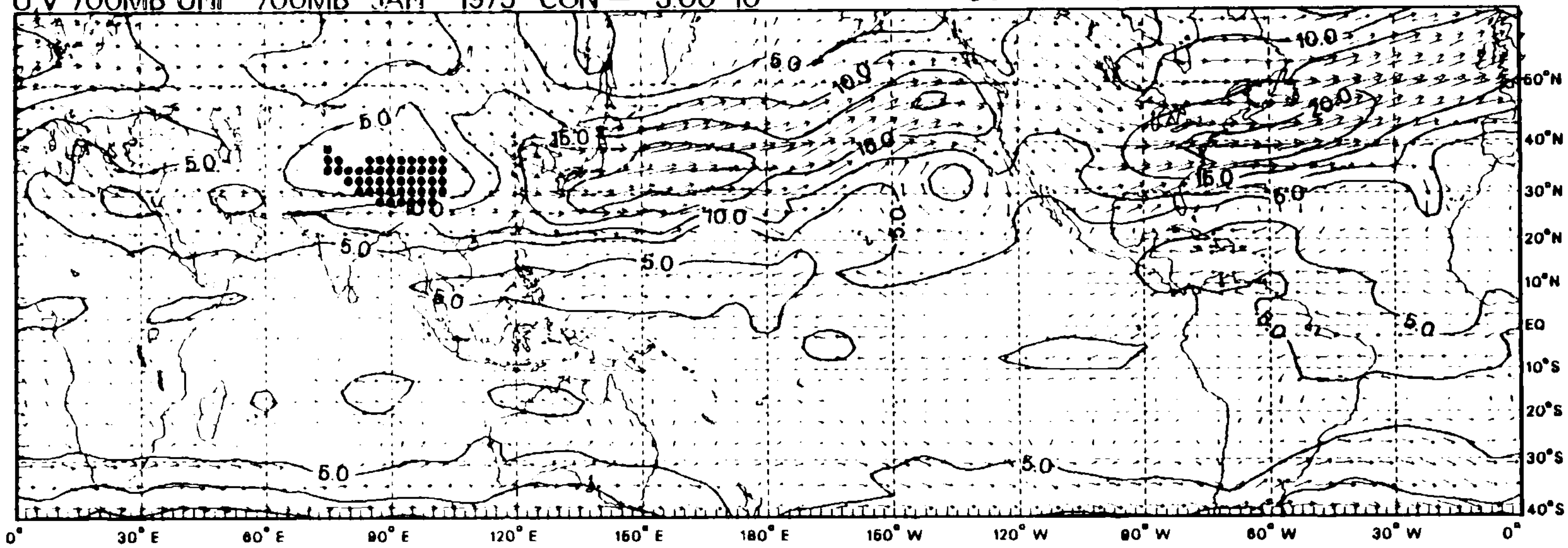

PSI 7475 UNF 700MB DEC 1974 DEV CON = $2.00*10^0$



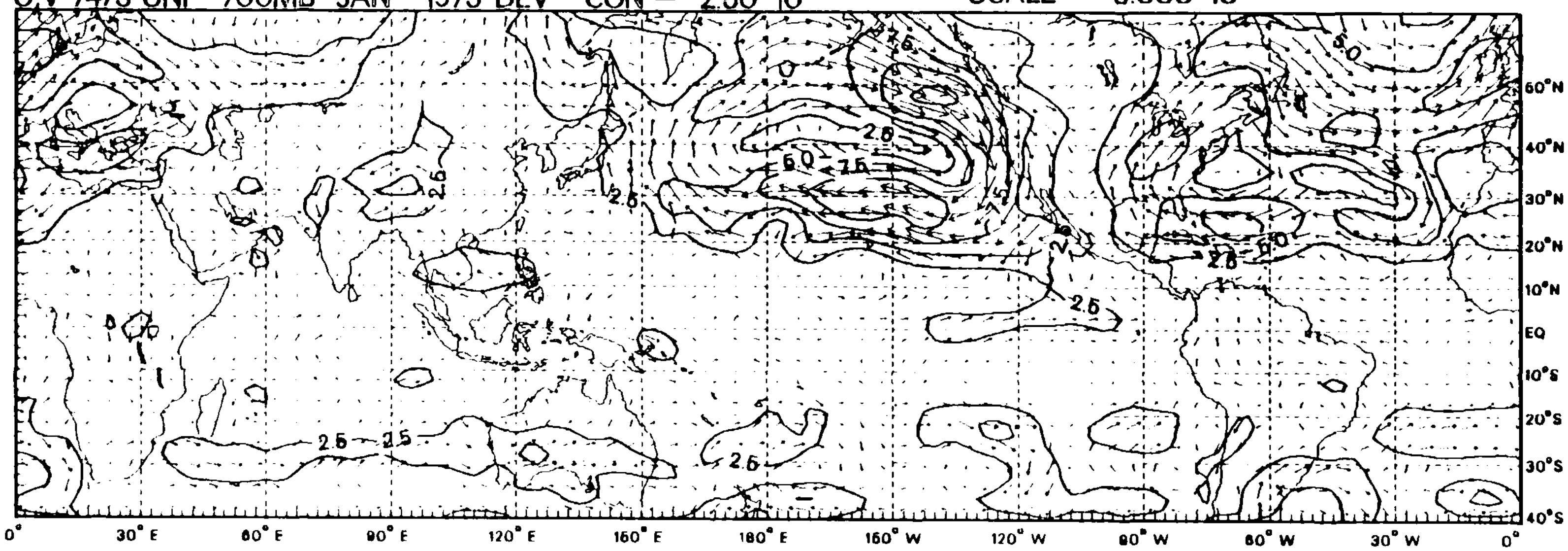

CHI UD,VD 700MB UNF 700MB DEC 1974 CON = 1.00*10^0 SCALE = 2.000*10^0
0° 30° E 60° E 90° E 120° E 150° E 180° E 150° W 120° W 90° W 60° W 30° W 0°
50°N 40°N 30°N 20°N 10°N EQ 10°S 20°S 30°S 40°S


CHI UD,VD 7475 UNF 700MB DEC 1974 DEV CON = 5.00*10^-1 SCALE = 1.000*10^0
0° 30° E 60° E 90° E 120° E 150° E 180° E 150° W 120° W 90° W 60° W 30° W 0°
50°N 40°N 30°N 20°N 10°N EQ 10°S 20°S 30°S 40°S

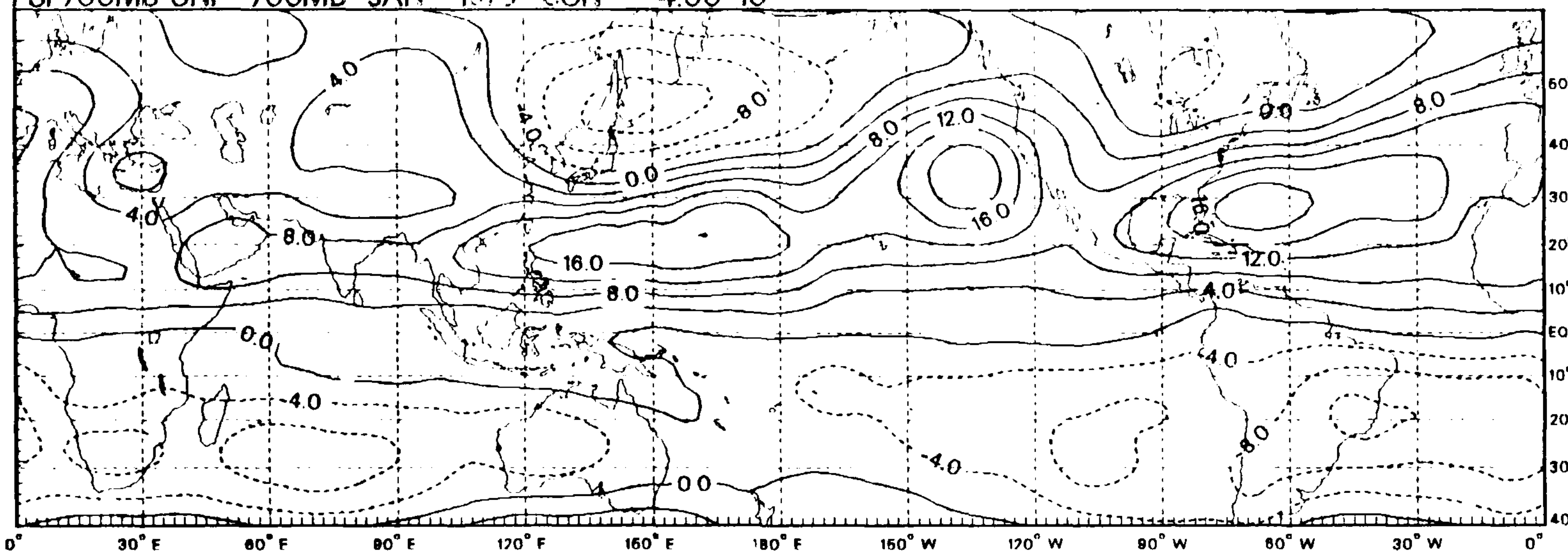
U,V 700MB UNF 700MB JAN 1975 CON = 5.00*10^0 SCALE = 1.000*10^1



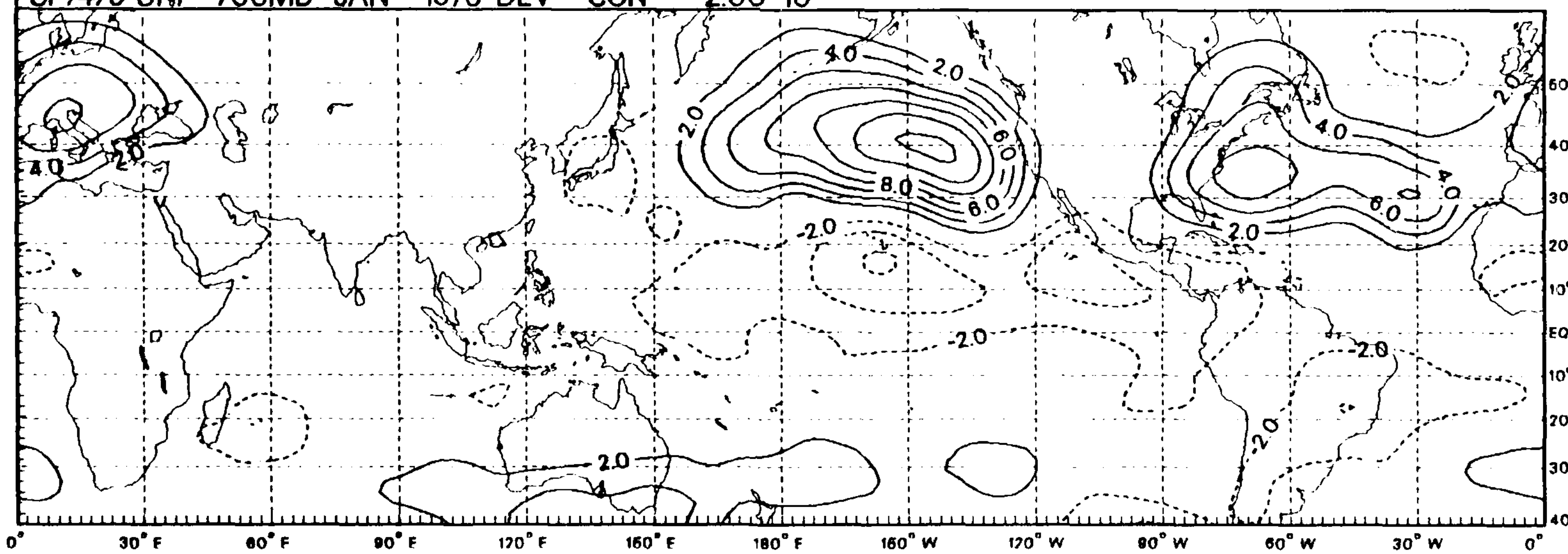

U,V 7475 UNF 700MB JAN 1975 DEV CON = 2.50*10^0 SCALE = 5.000*10^0



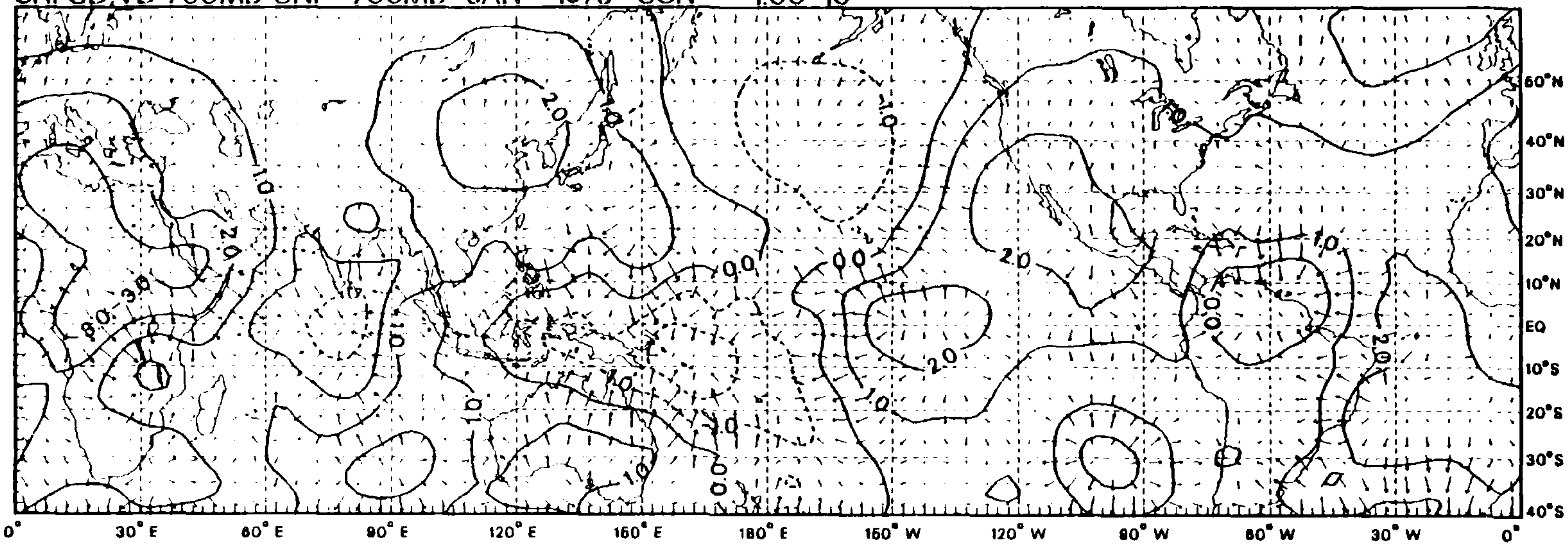
PSI 700MB UNF 700MB JAN 1975 CON = 4.00*10$^0$



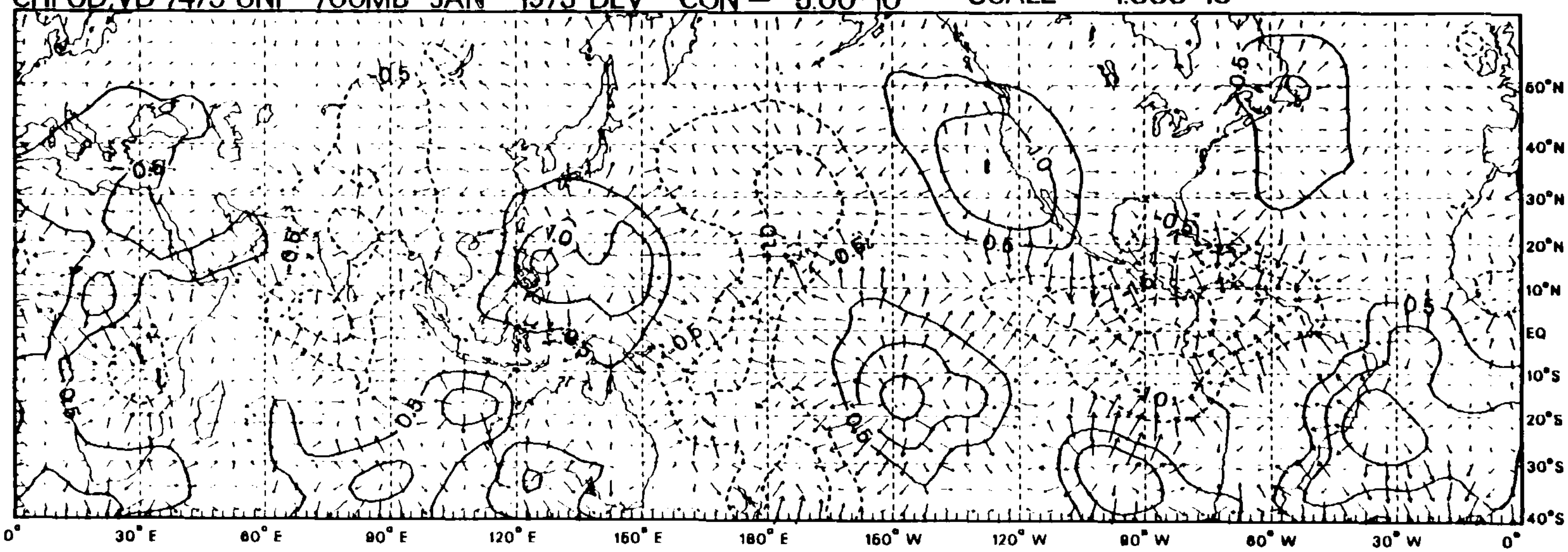

PSI 7475 UNF 700MB JAN 1975 DEV CON = 2.00*10$^0$



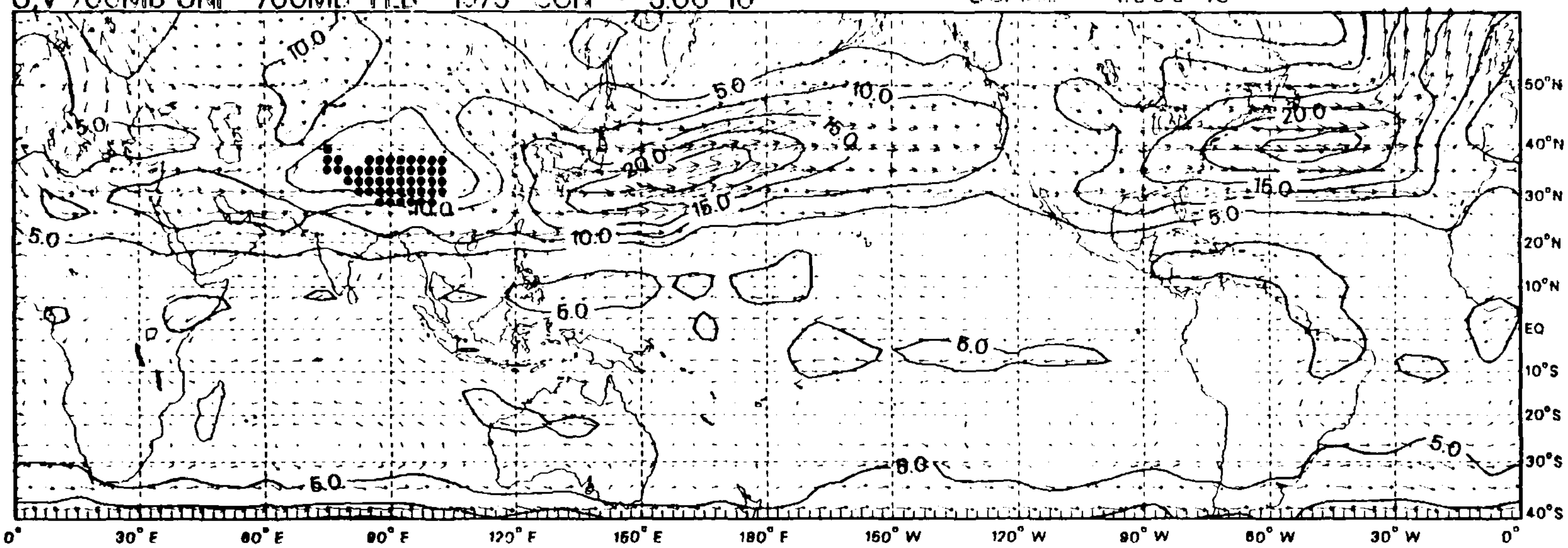
CHI UD,VD 700MB UNF 700MB JAN 1975 CON = 1.00*10⁰ SCALE = 2.000*10⁰



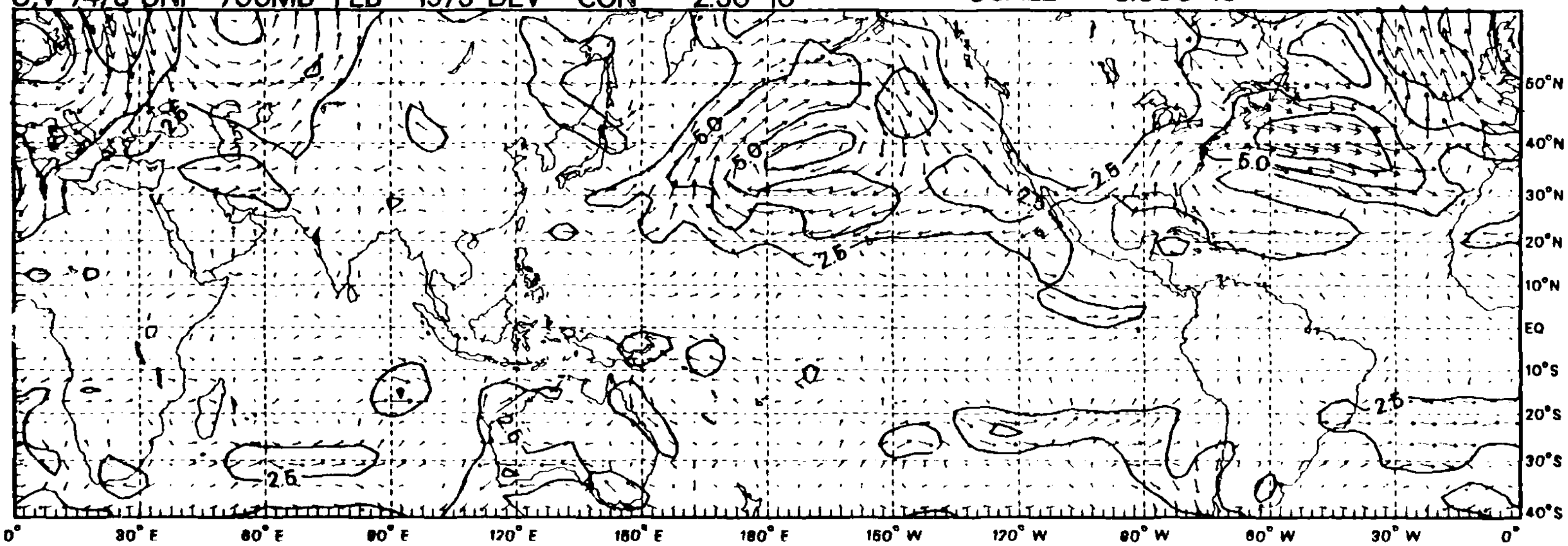

CHI UD,VD 7475 UNF 700MB JAN 1975 DEV CON = 5.00*10⁻¹ SCALE = 1.000*10⁰



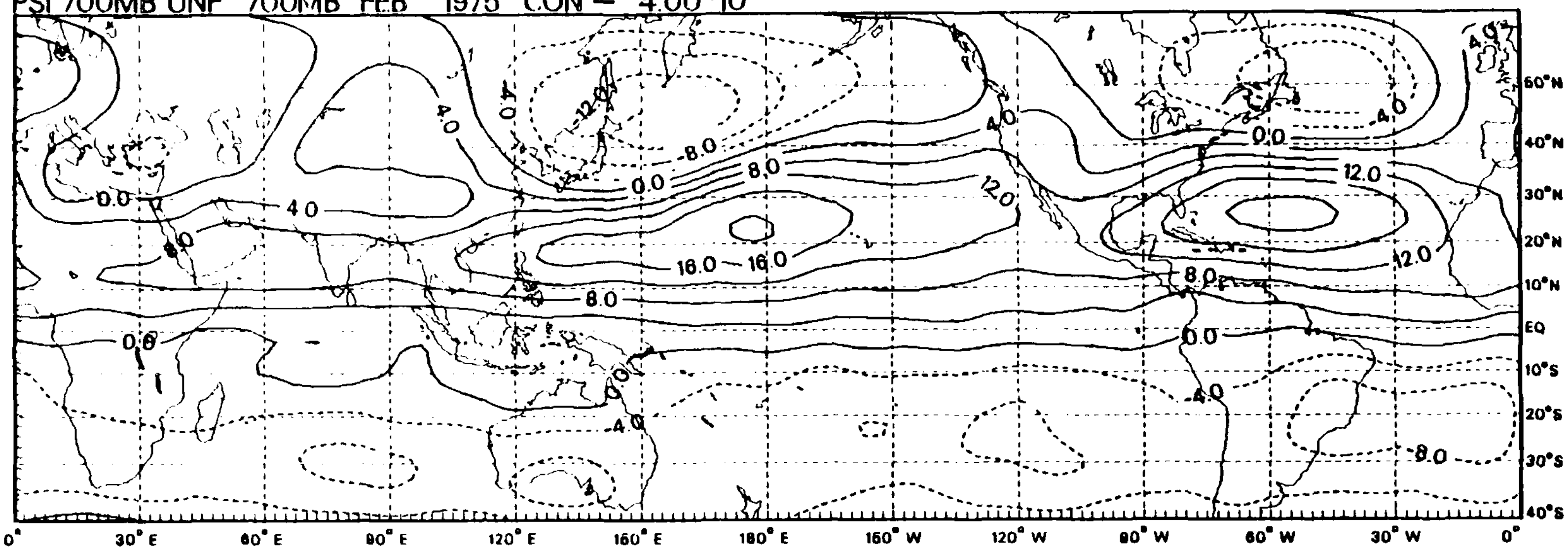
U,V 700MB UNF 700MB FEB 1975 CON = $5.00*10^{0}$ SCALE = $1.000*10^{1}$



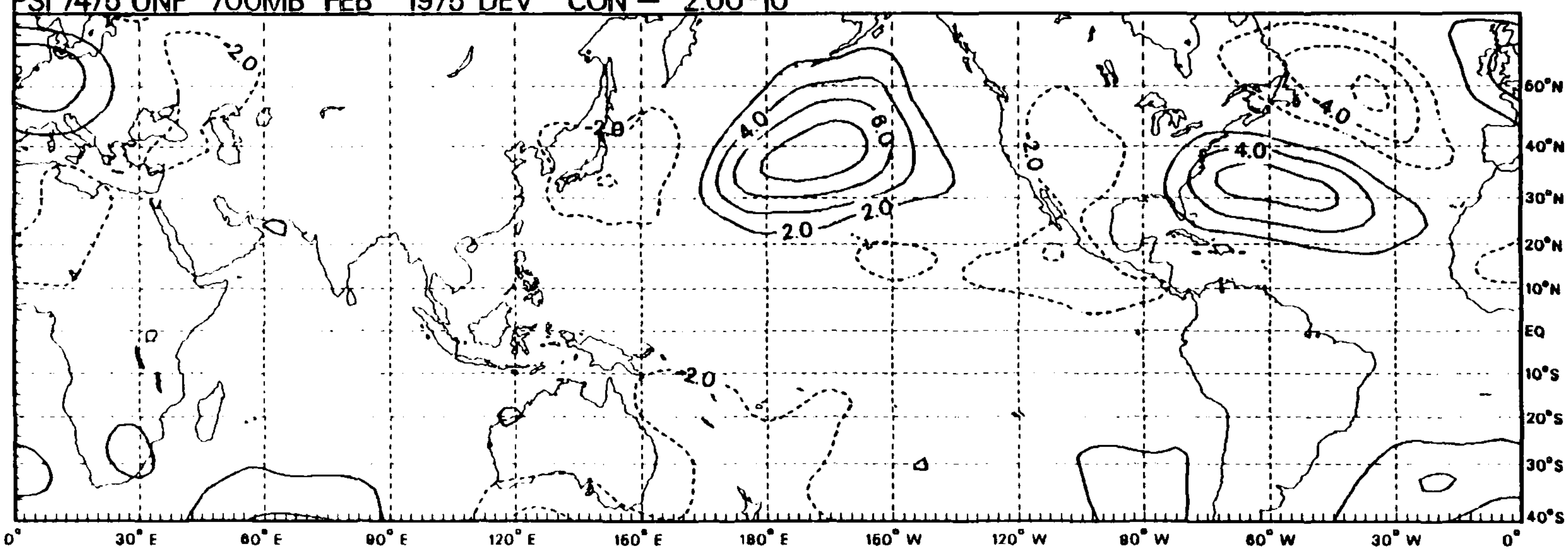

U,V 7475 UNF 700MB FEB 1975 DEV CON = $2.50*10^{0}$ SCALE = $5.000*10^{0}$



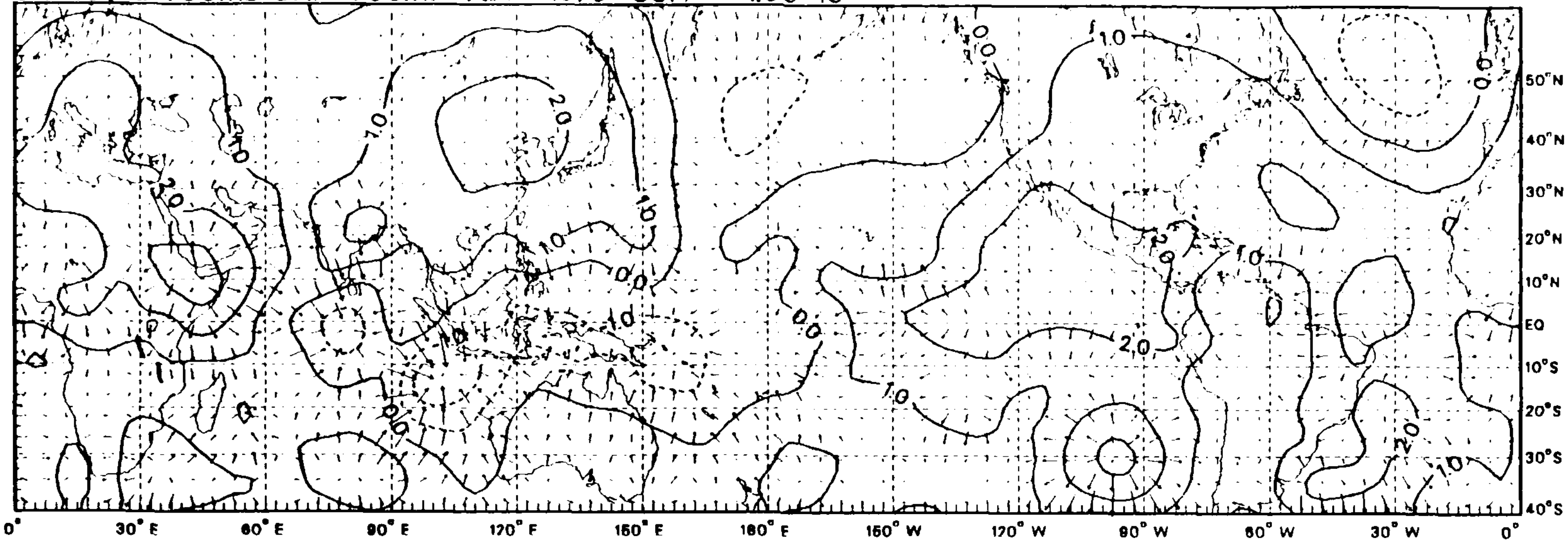
PSI 700MB UNF 700MB FEB 1975 CON = 4.00*10⁰



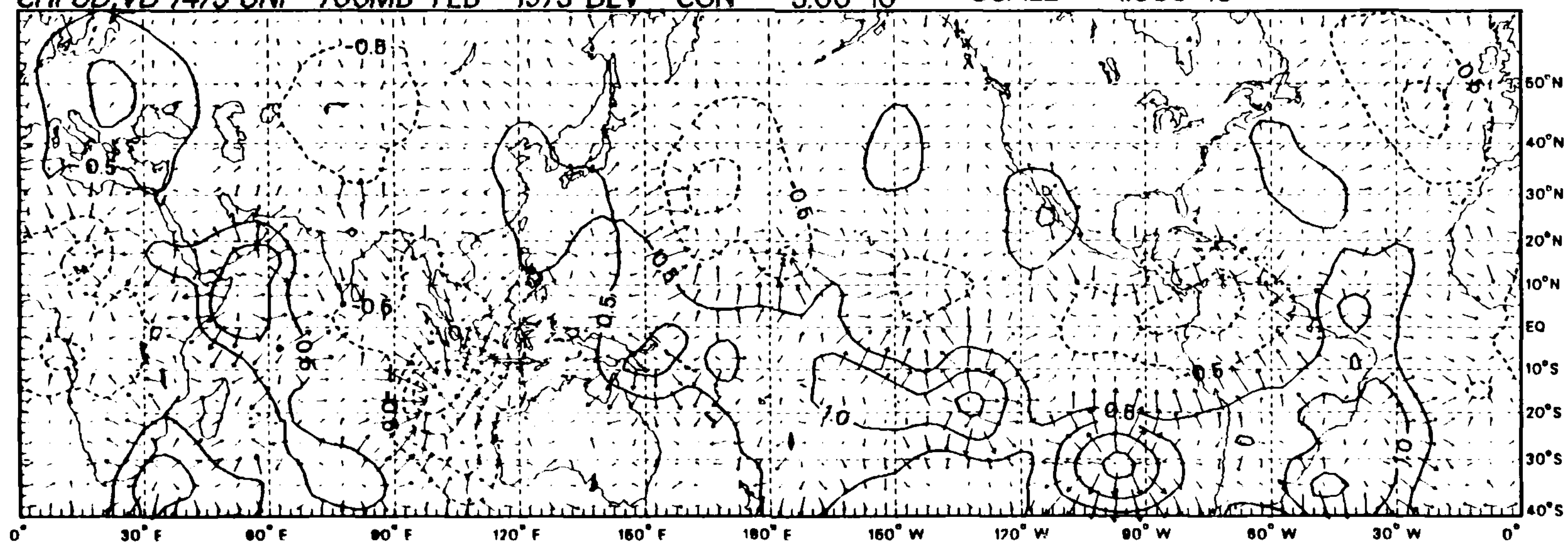

PSI 7475 UNF 700MB FEB 1975 DEV CON = 2.00*10⁰



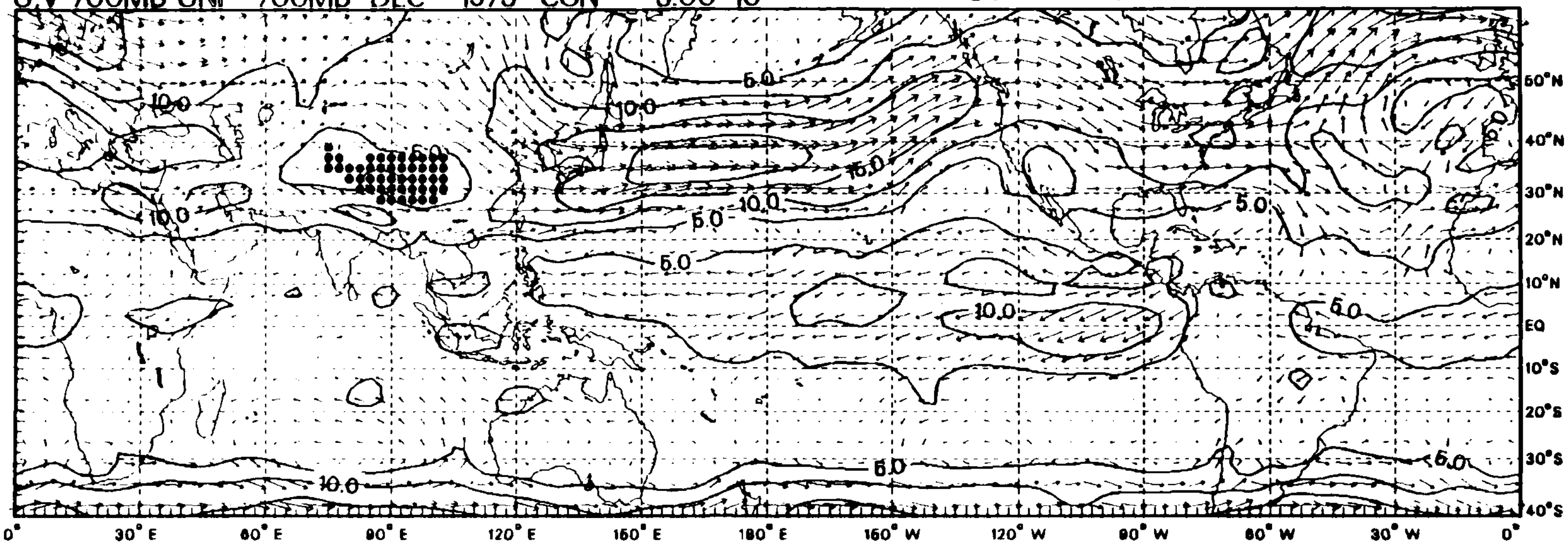
CHI UD,VD 700MB UNF 700MB FEB 1975 CON = $1.00*10^{0}$ SCALE = $2.000*10^{0}$



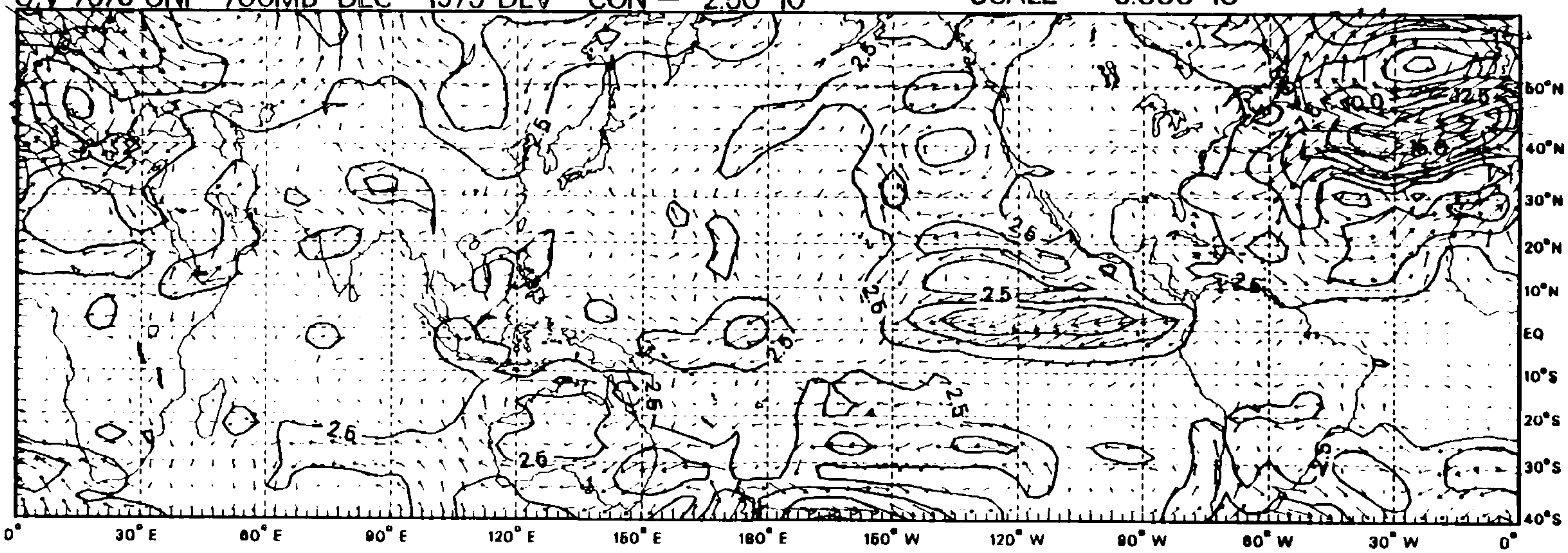

CHI UD,VD 7475 UNF 700MB FEB 1975 DEV CON = $5.00*10^{-1}$ SCALE = $1.000*10^{0}$



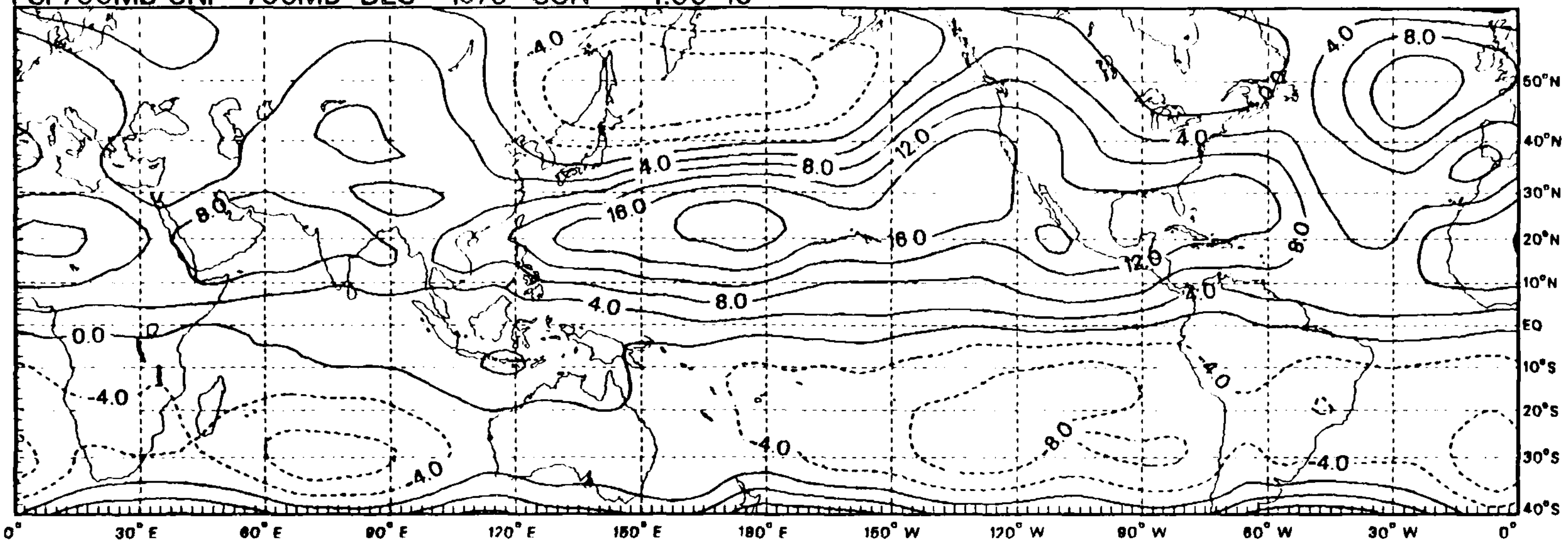
U,V 700MB UNF 700MB DEC 1975 CON = $5.00*10^{0}$ SCALE = $1.000*10^{1}$



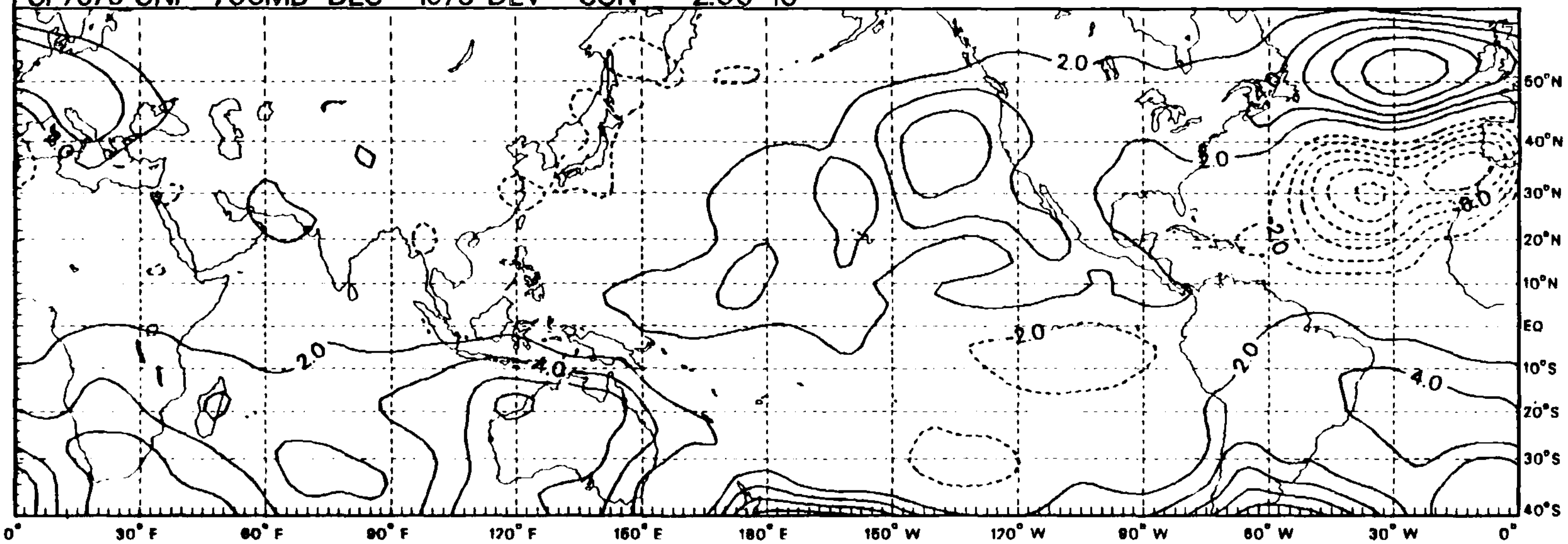

U,V 7576 UNF 700MB DEC 1975 DEV CON = $2.50*10^{0}$ SCALE = $5.000*10^{0}$



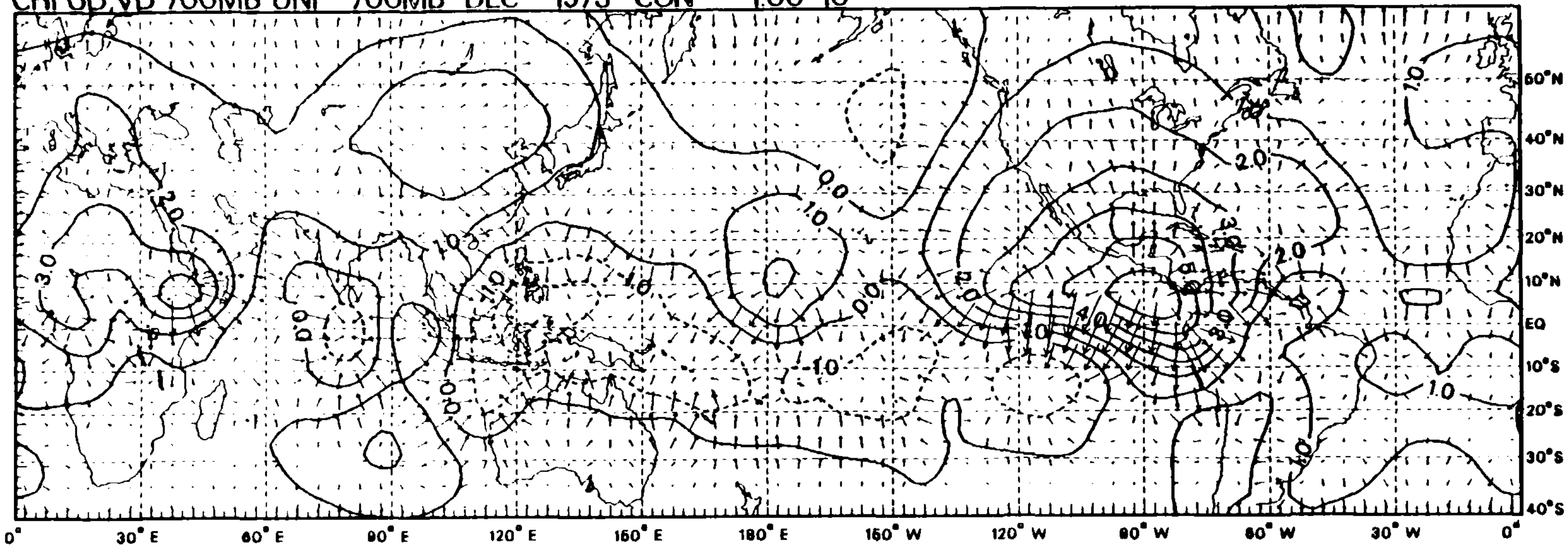
PSI 700MB UNF 700MB DEC 1975 CON = $4.00*10^0$



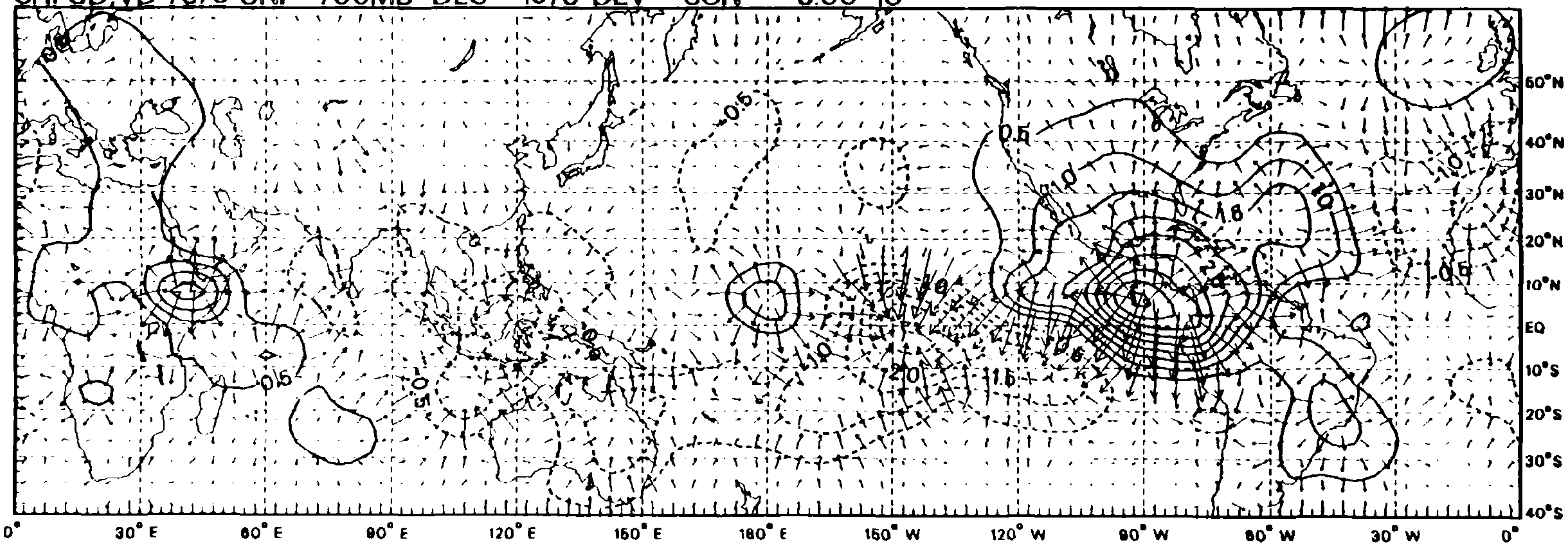

PSI 7576 UNF 700MB DEC 1975 DEV CON = $2.00*10^0$



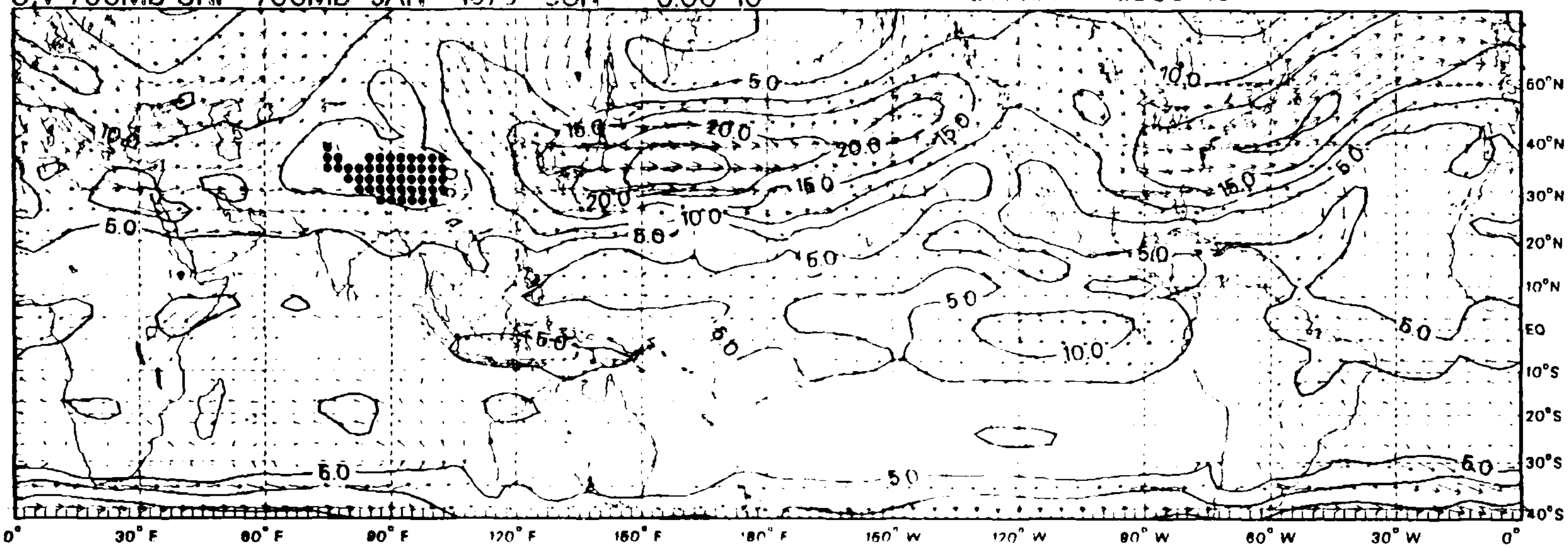
CHI UD,VD 700MB UNF 700MB DEC 1975 CON = $1.00*10^{0}$ SCALE = $2.000*10^{0}$



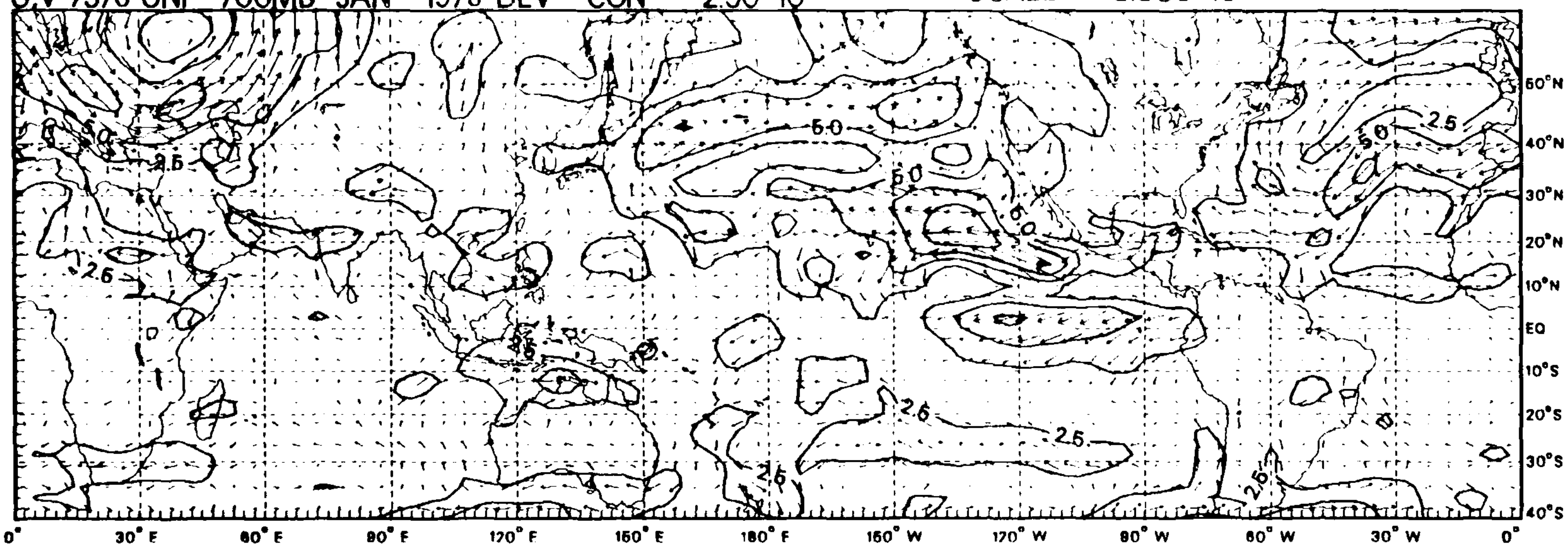

CHI UD,VD 7576 UNF 700MB DEC 1975 DEV CON = $5.00*10^{-1}$ SCALE = $1.000*10^{0}$



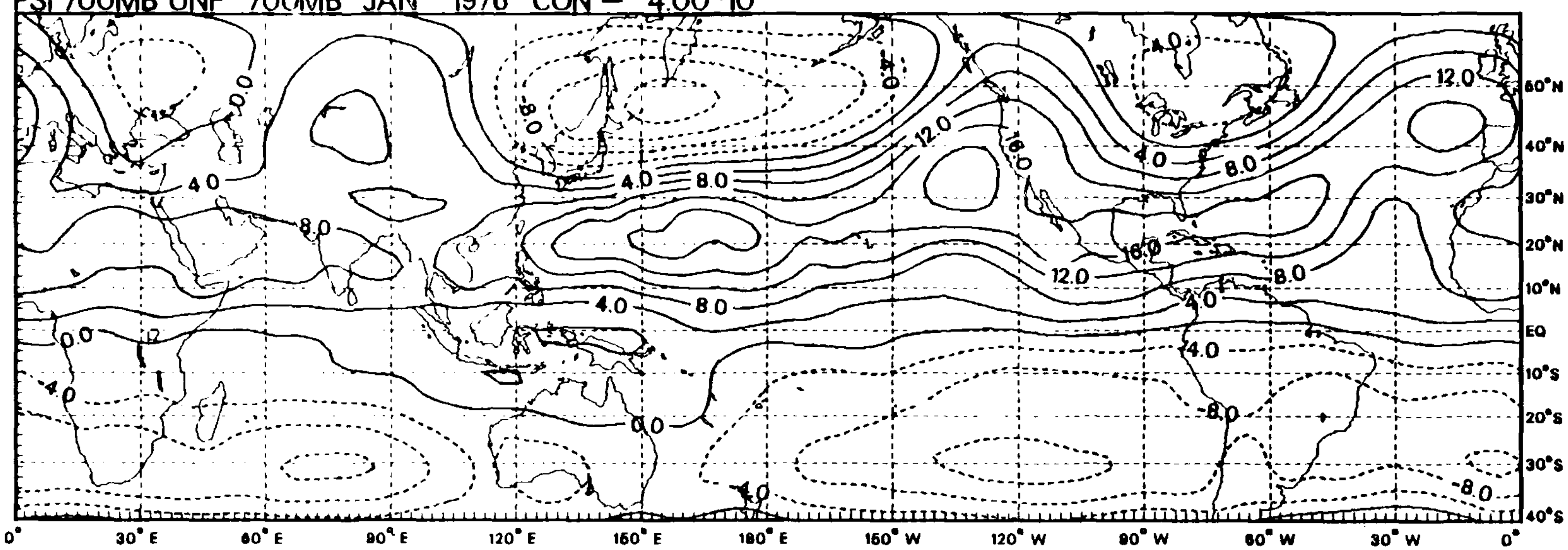
U,V 700MB UNF 700MB JAN 1976 CON = 5.00*10⁰ SCALE = 1.000*10¹



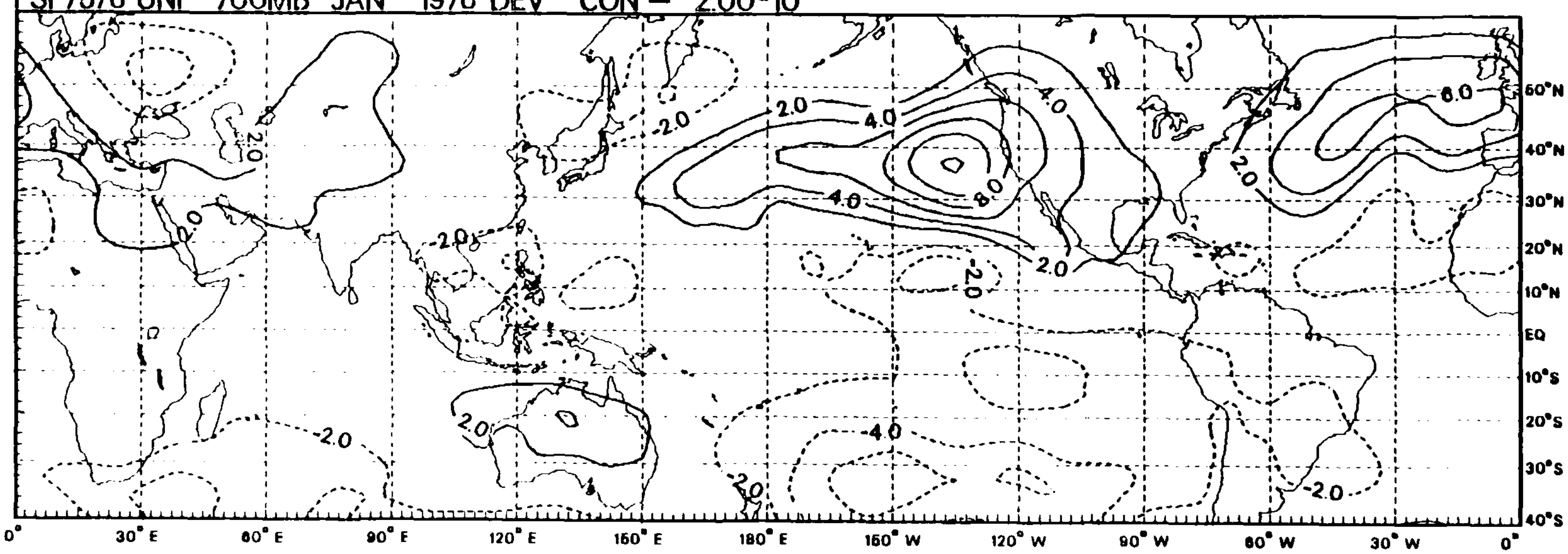

U,V 7576 UNF 700MB JAN 1976 DEV CON = 2.50*10⁰ SCALE = 5.000*10⁰



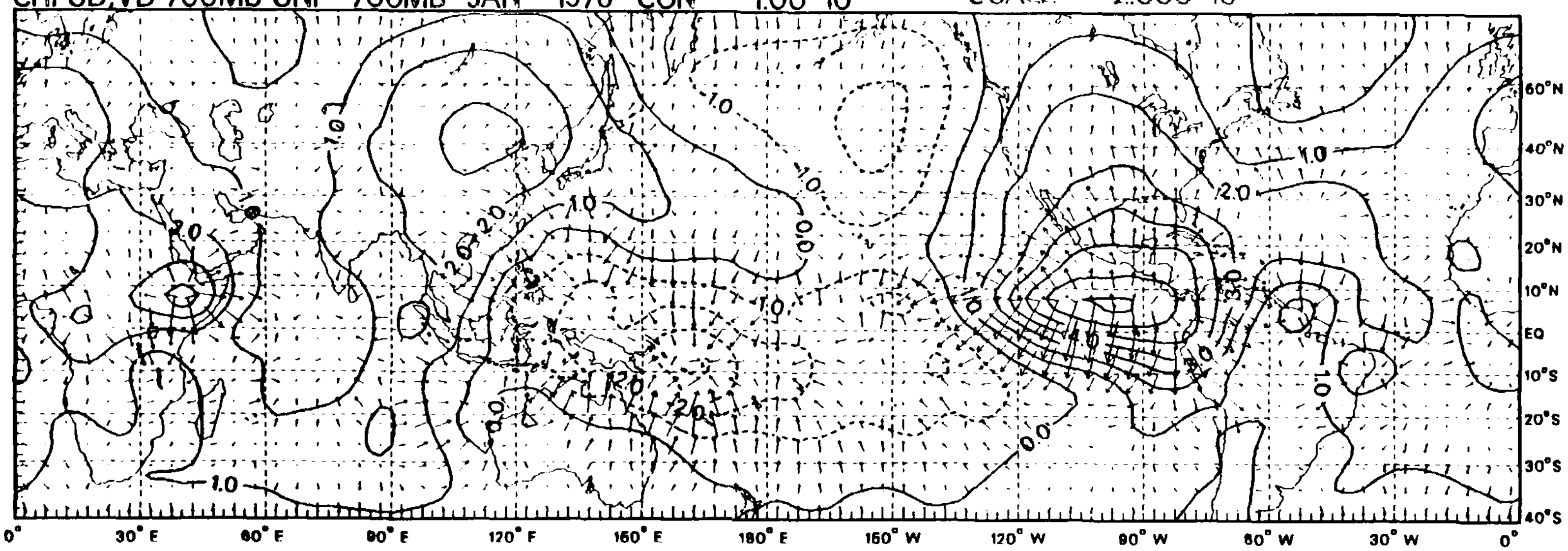
PSI 700MB UNF 700MB JAN 1976 CON = 4.00*10$^0$



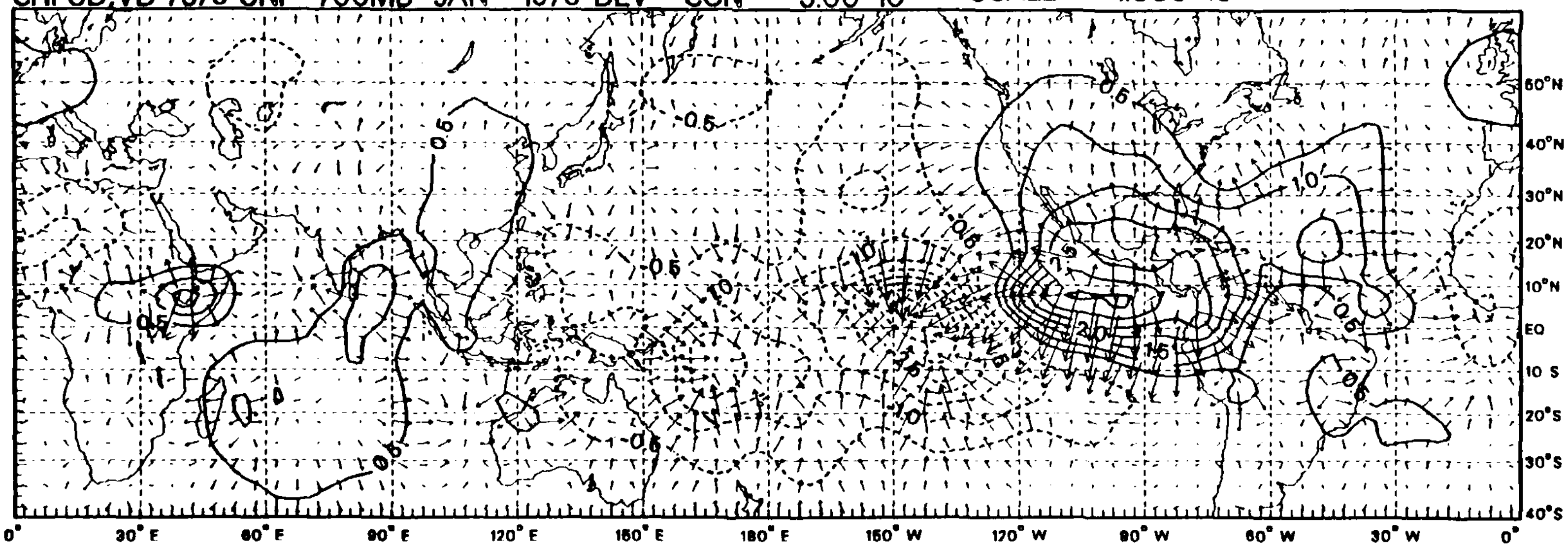

PSI 7576 UNF 700MB JAN 1976 DEV CON = 2.00*10$^0$



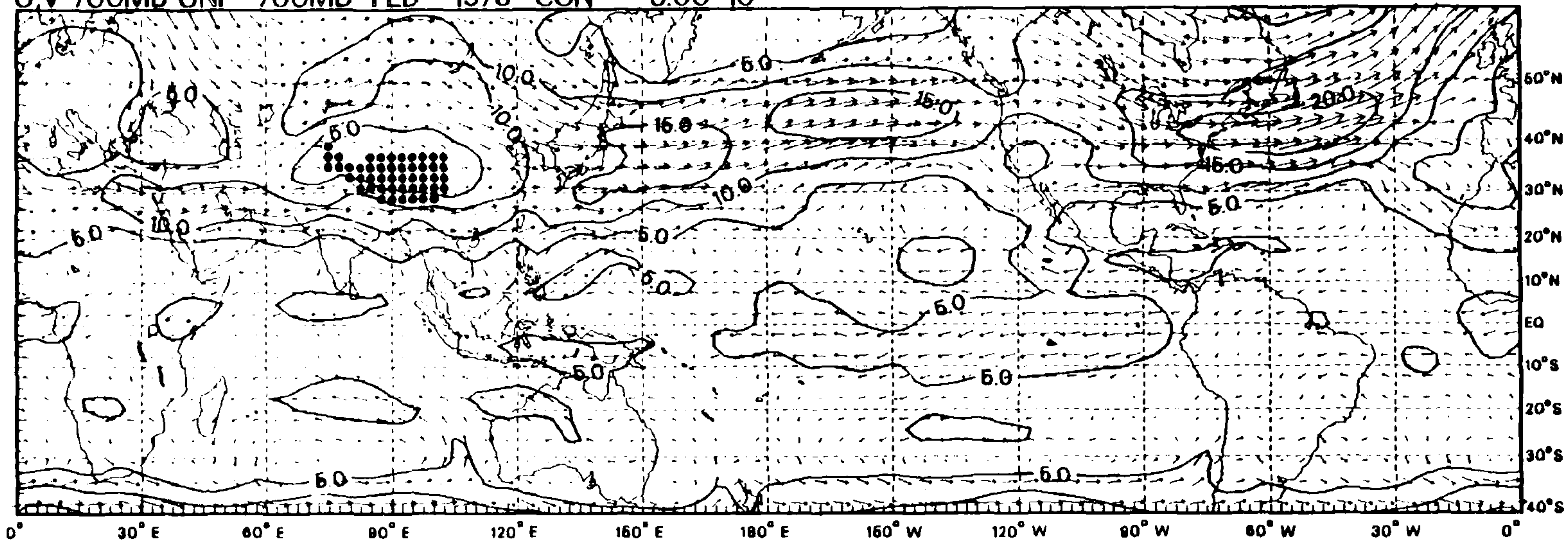
CHI UD,VD 700MB UNF 700MB JAN 1976 CON = $1.00*10^0$ SCALE = $2.000*10^0$



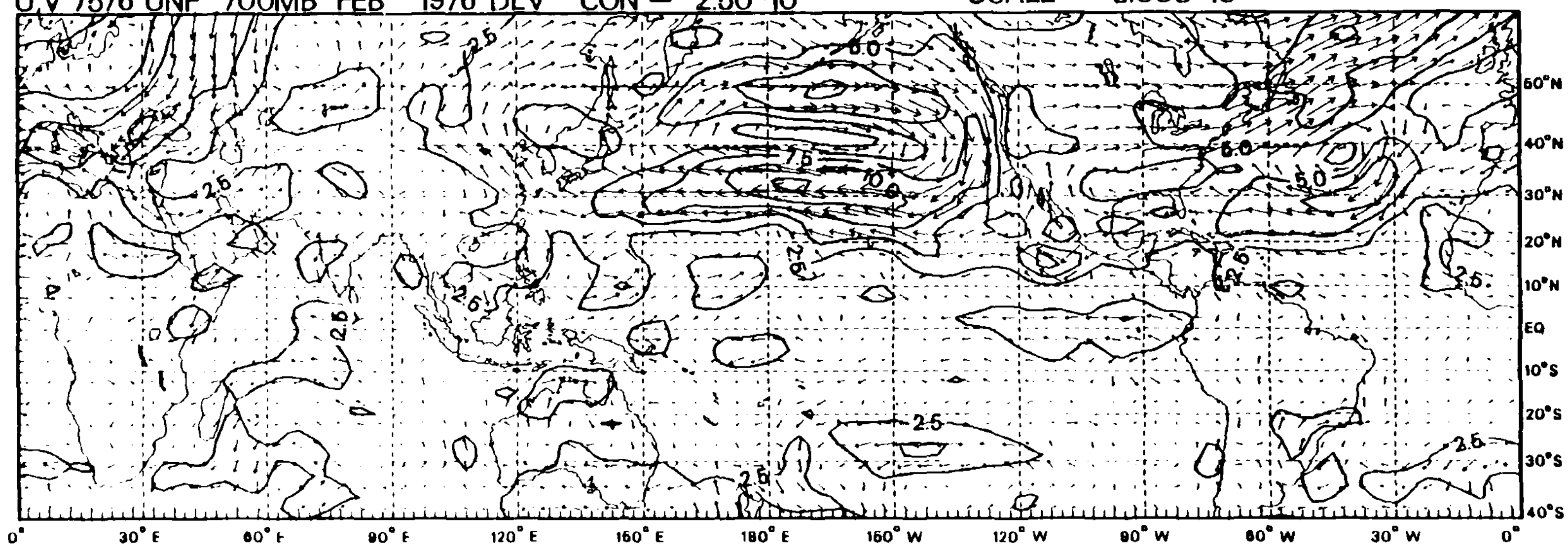

CHI UD,VD 7576 UNF 700MB JAN 1976 DEV CON = $5.00*10^{-1}$ SCALE = $1.000*10^0$



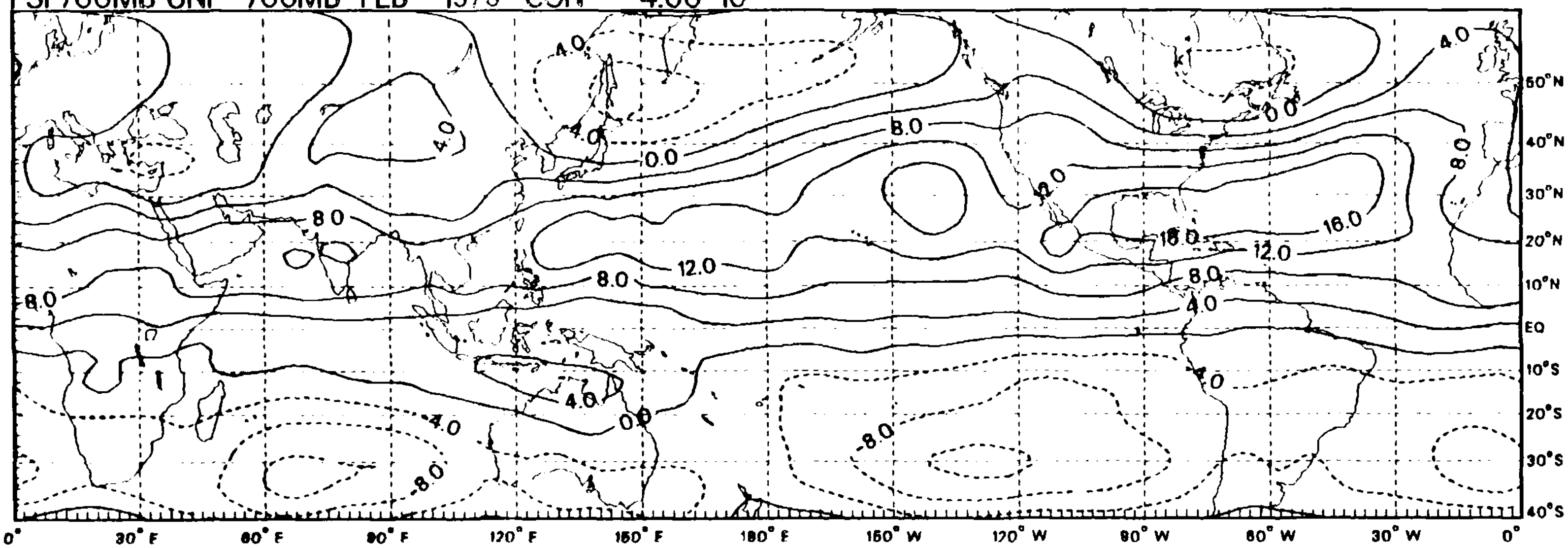
U,V 700MB UNF 700MB FEB 1976 CON = $5.00*10^0$ SCALE = $1.000*10^1$



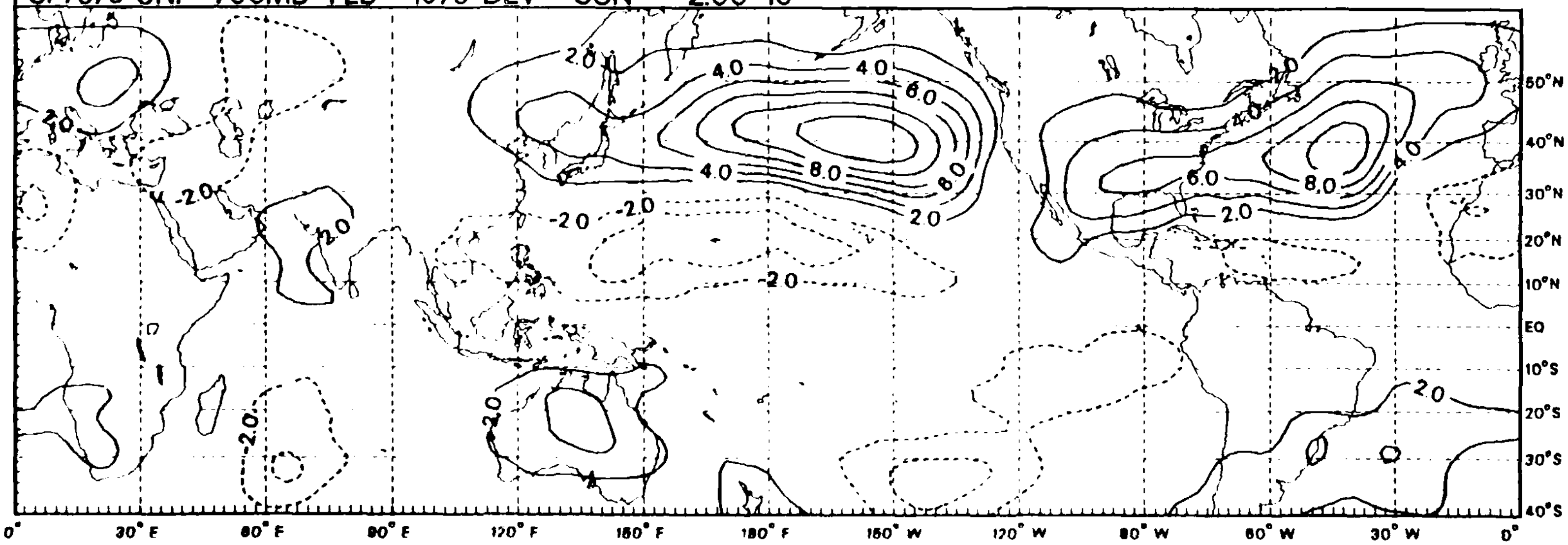

U,V 7576 UNF 700MB FEB 1976 DEV CON = $2.50*10^0$ SCALE = $5.000*10^0$



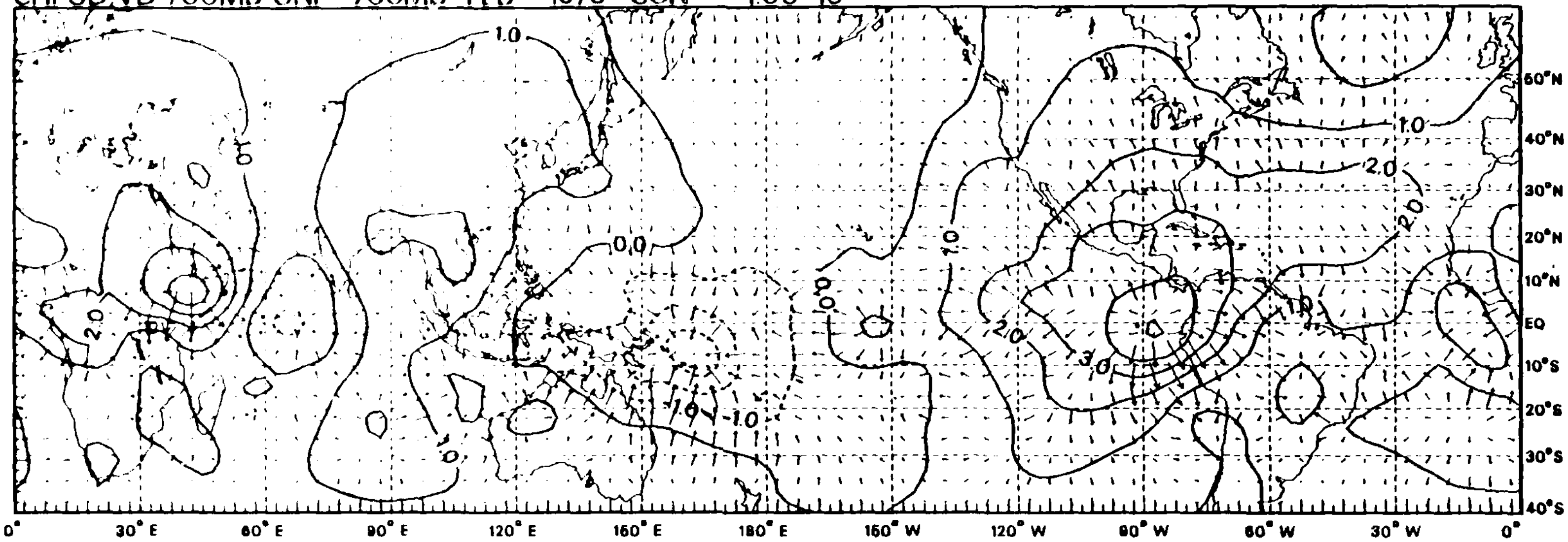
PSI 700MB UNF 700MB FEB 1976 CON = 4.00*10$^0$



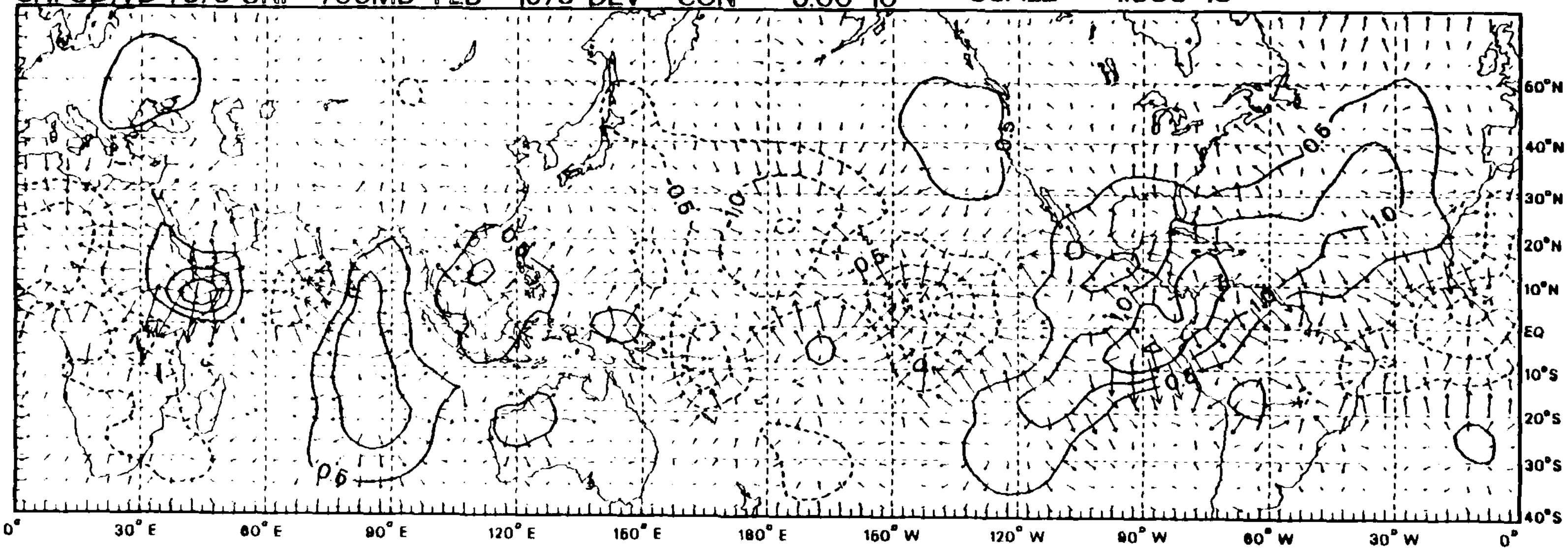

PSI 7576 UNF 700MB FEB 1976 DEV CON = 2.00*10$^0$



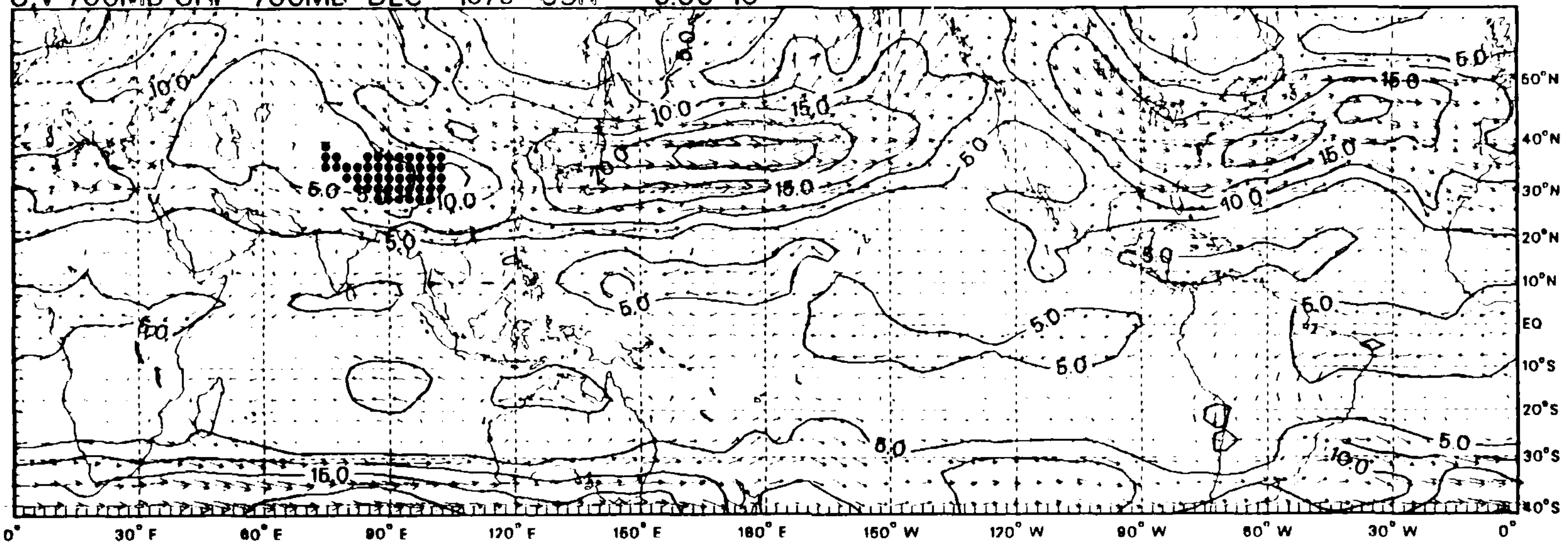
CHI UD,VD 700MB UNF 700MB FEB 1976 CON = $1.00*10^{0}$ SCALE = $2.000*10^{0}$ —



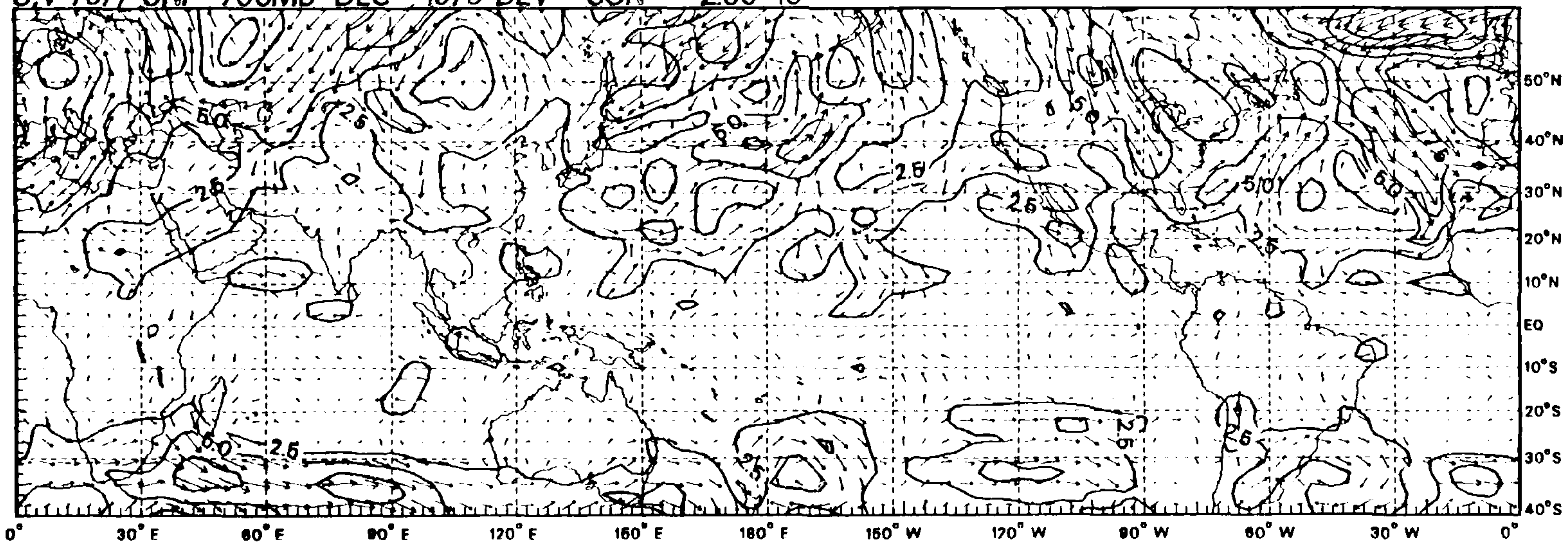

CHI UD,VD 7576 UNF 700MB FEB 1976 DEV CON = $5.00*10^{-1}$ SCALE = $1.000*10^{0}$ —



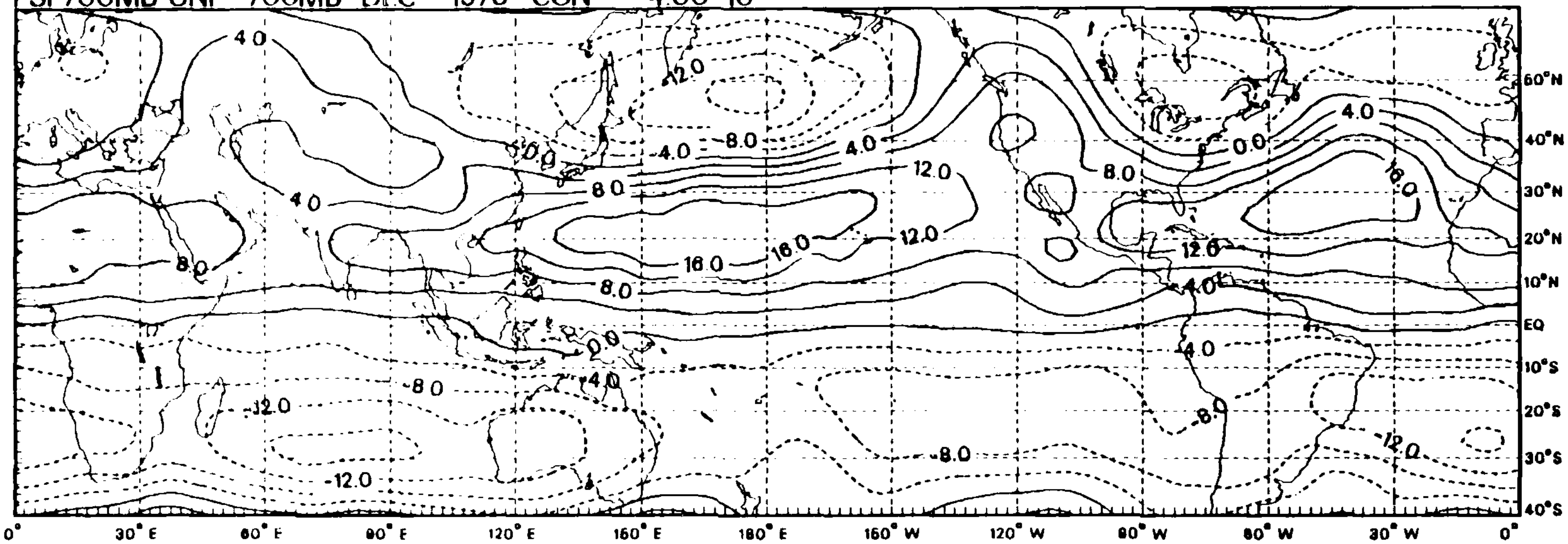
U,V 700MB UNF 700MB DEC 1976 CON = 5.00*10⁰ SCALE = 1.000*10¹



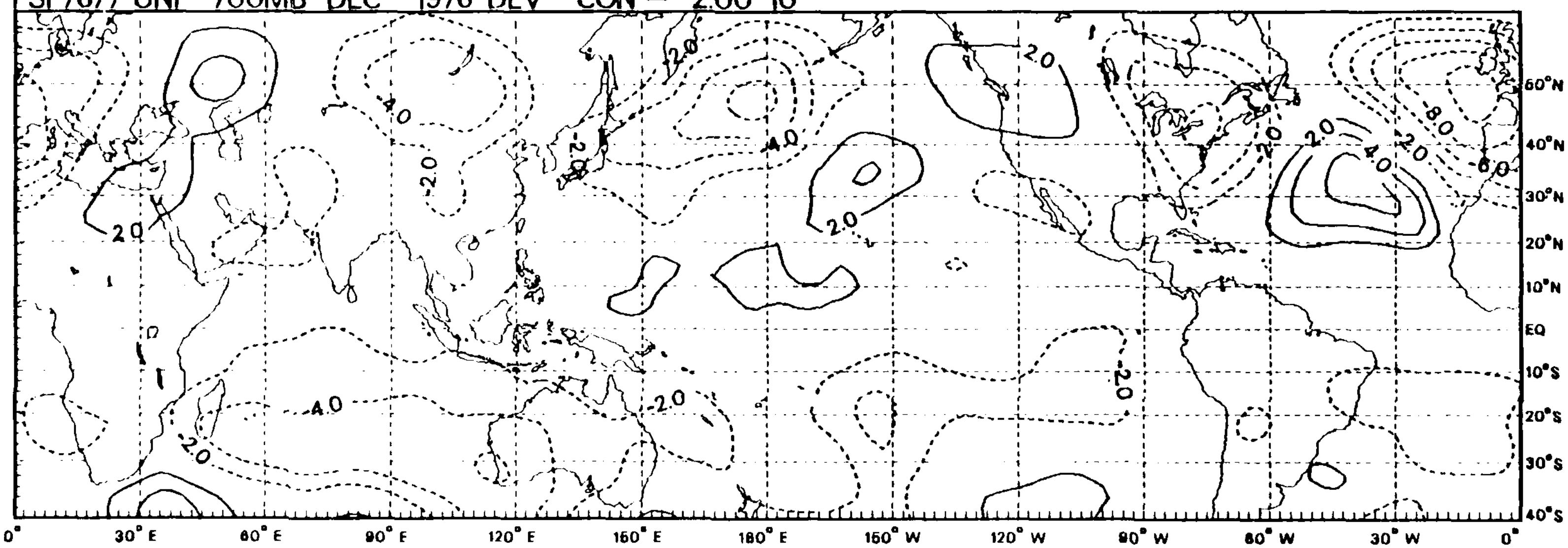

U,V 7677 UNF 700MB DEC 1976 DEV CON = 2.50*10⁰ SCALE = 5.000*10⁰



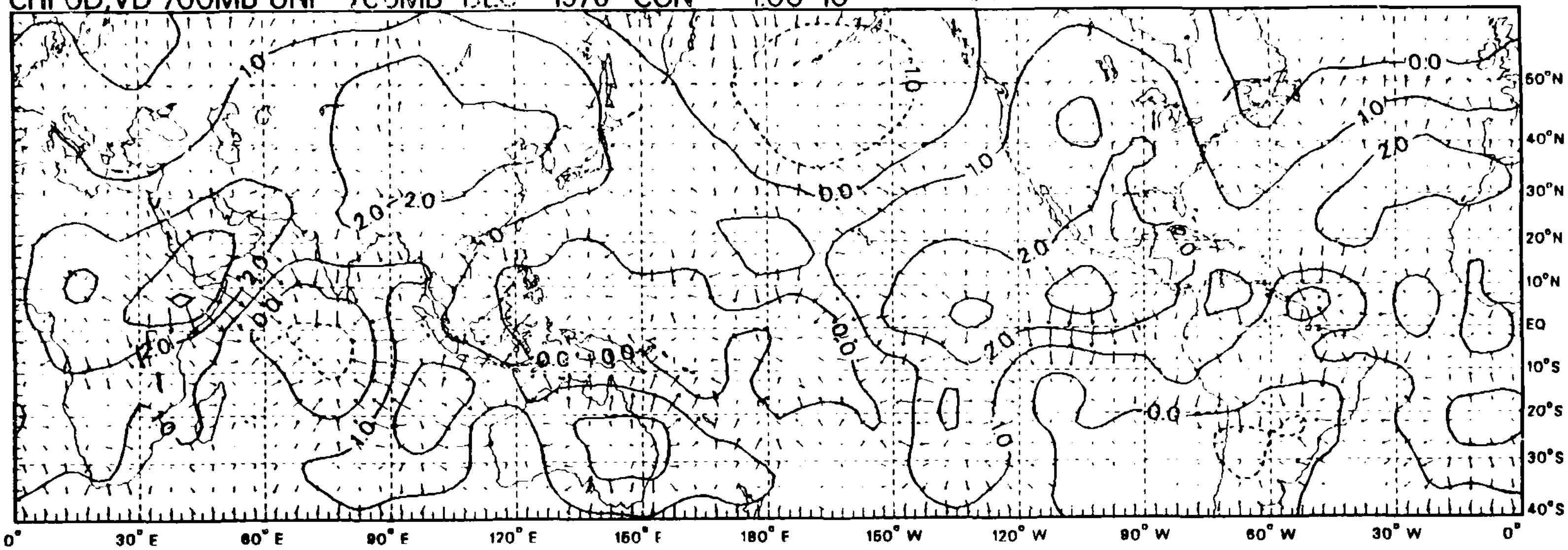
PSI 700MB UNF 700MB DEC 1976 CON = 4.00*10⁰



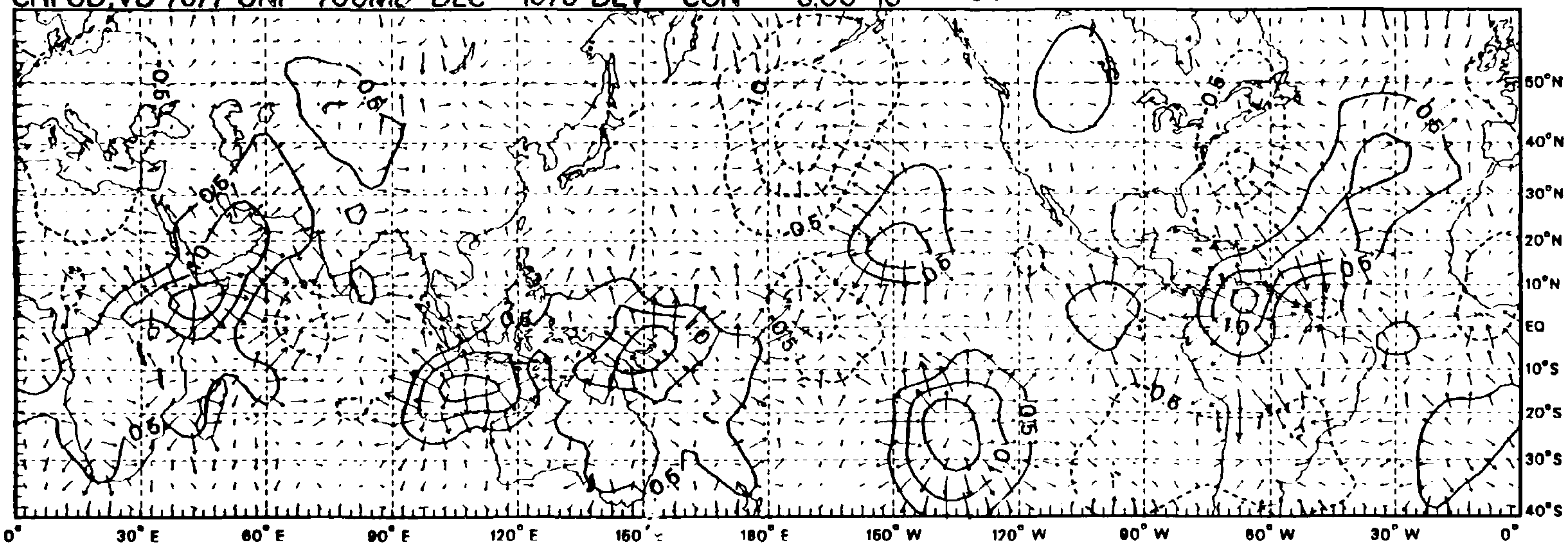

PSI 7677 UNF 700MB DEC 1976 DEV CON = 2.00*10⁰



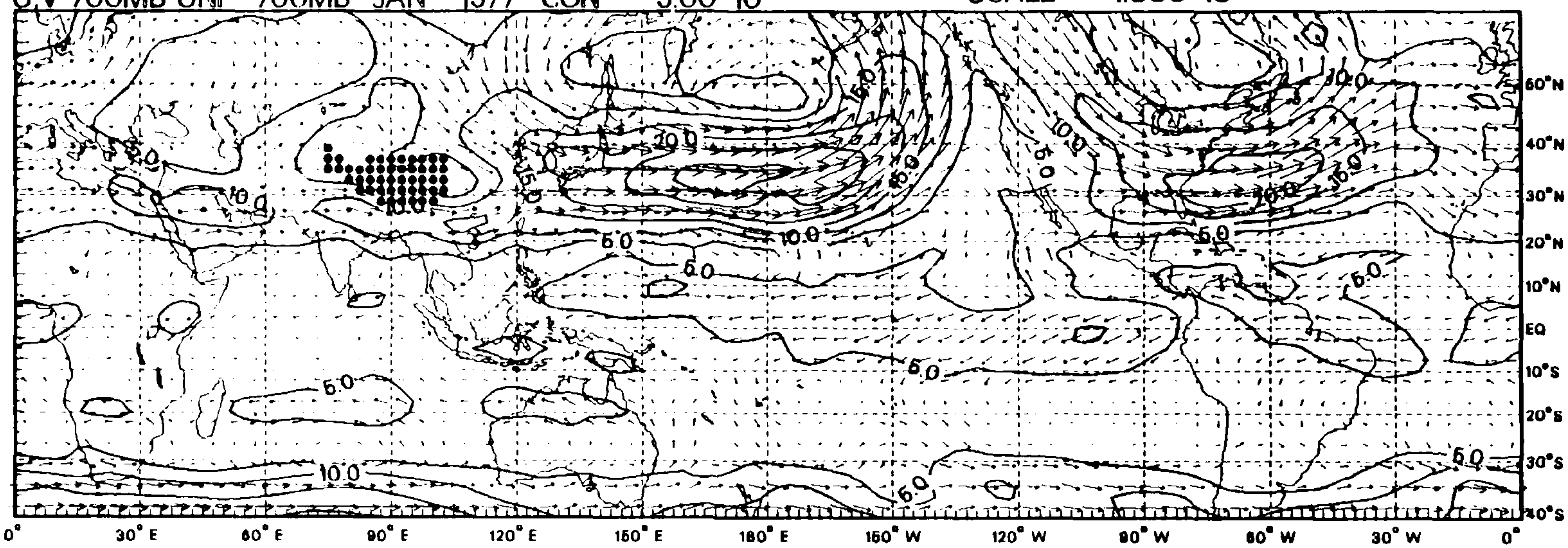
CHI UD,VD 700MB UNF 700MB DEC 1976 CON = $1.00*10^{0}$ SCALE = $2.000*10^{0}$



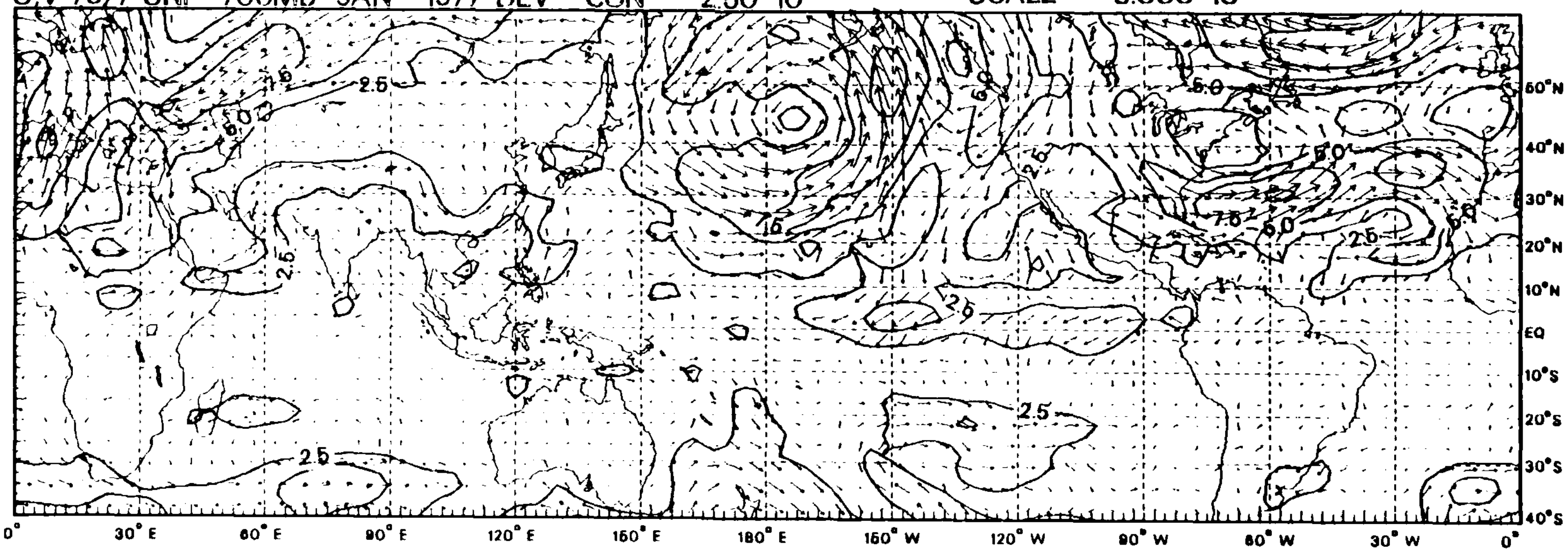

CHI UD,VD 7677 UNF 700MB DEC 1976 DEV CON = $5.00*10^{-1}$ SCALE = $1.000*10^{0}$



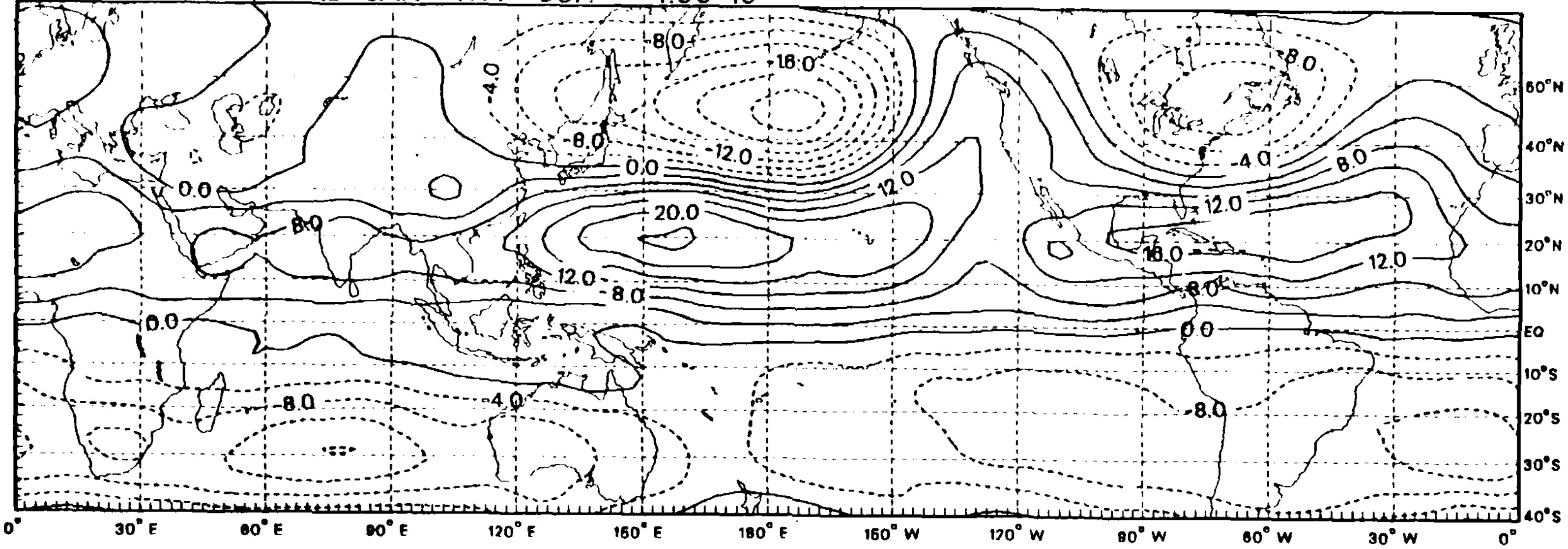
U,V 700MB UNF 700MB JAN 1977 CON = 5.00*10$^{0}$ SCALE = 1.000*10$^{1}$



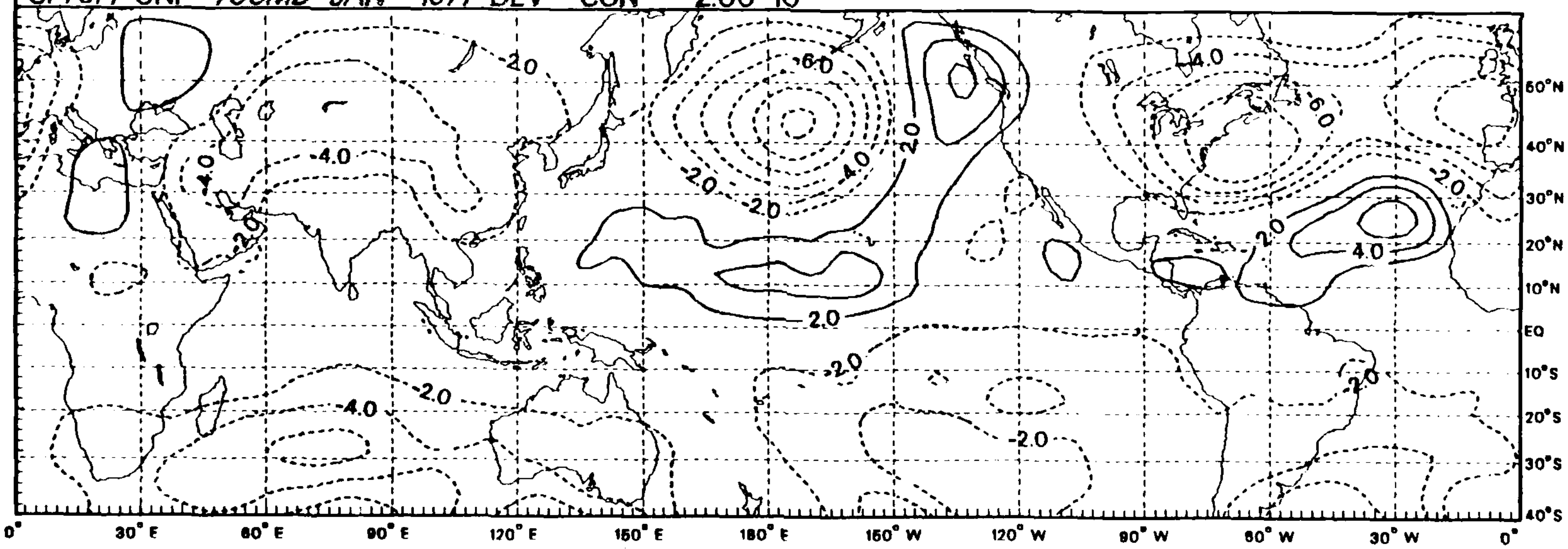

U,V 7677 UNF 700MB JAN 1977 DEV CON = 2.50*10$^{0}$ SCALE = 5.000*10$^{0}$

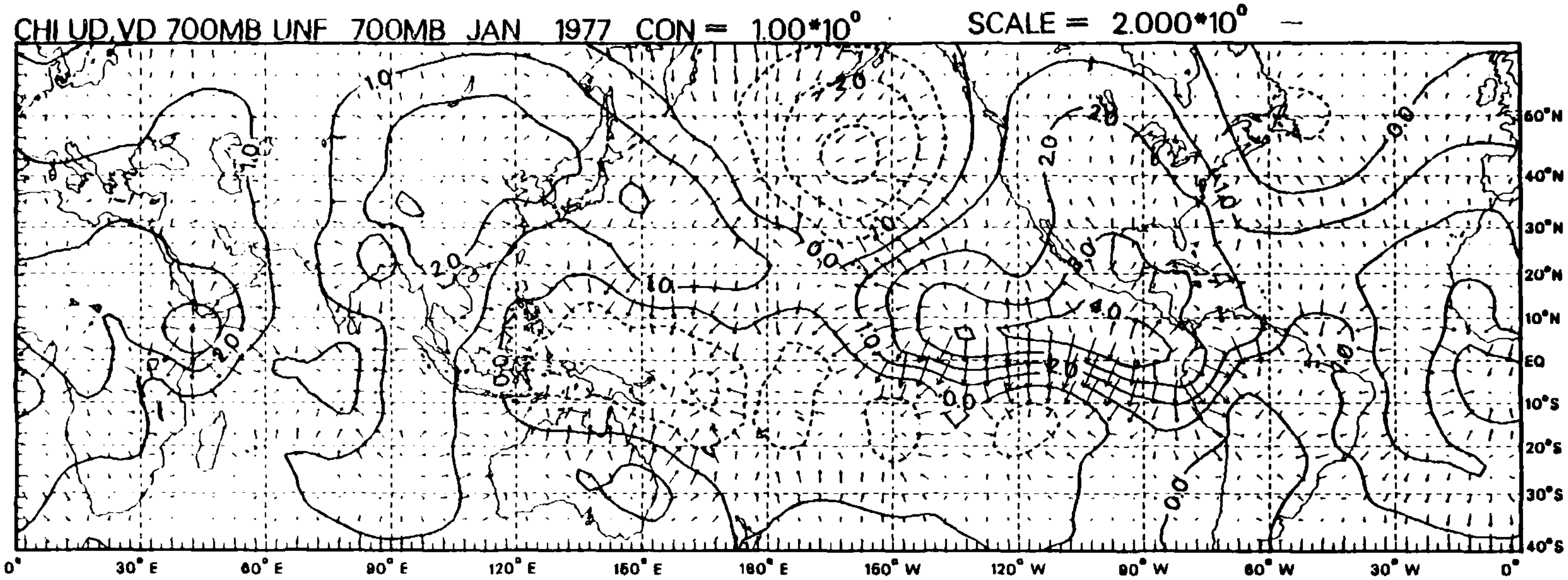


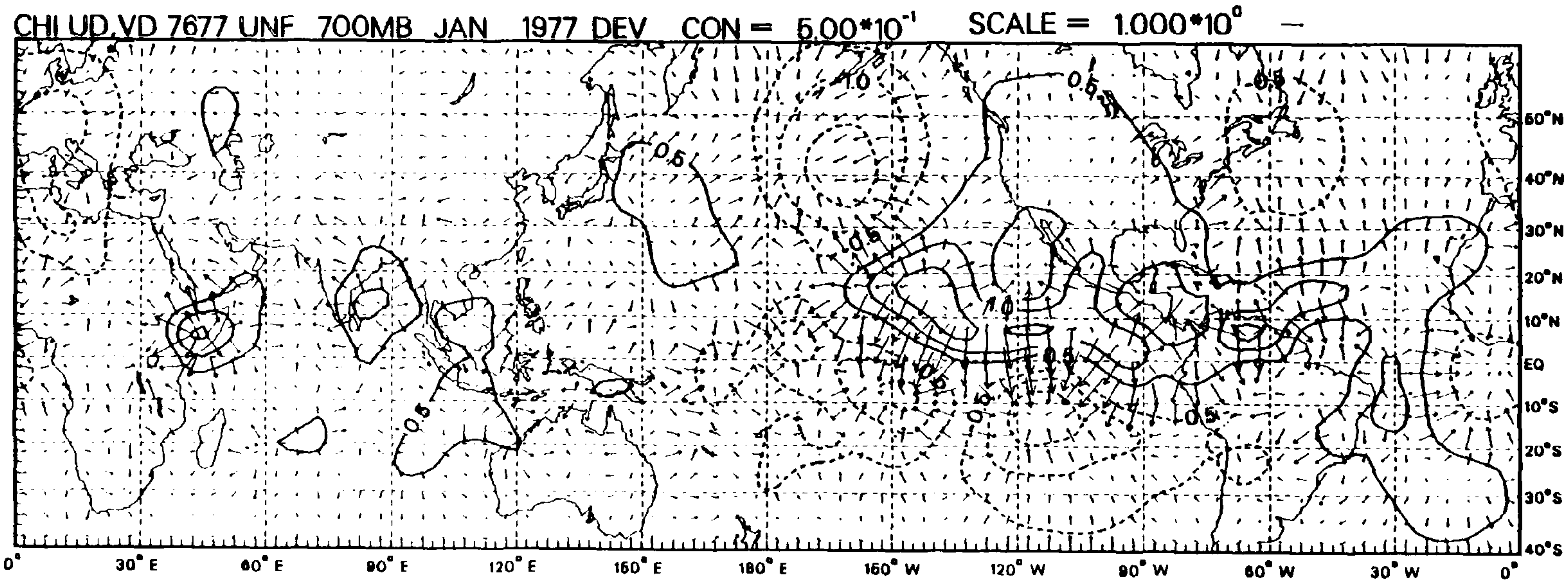
PSI 700MB UNF 700MB JAN 1977 CON = $4.00*10^{0}$



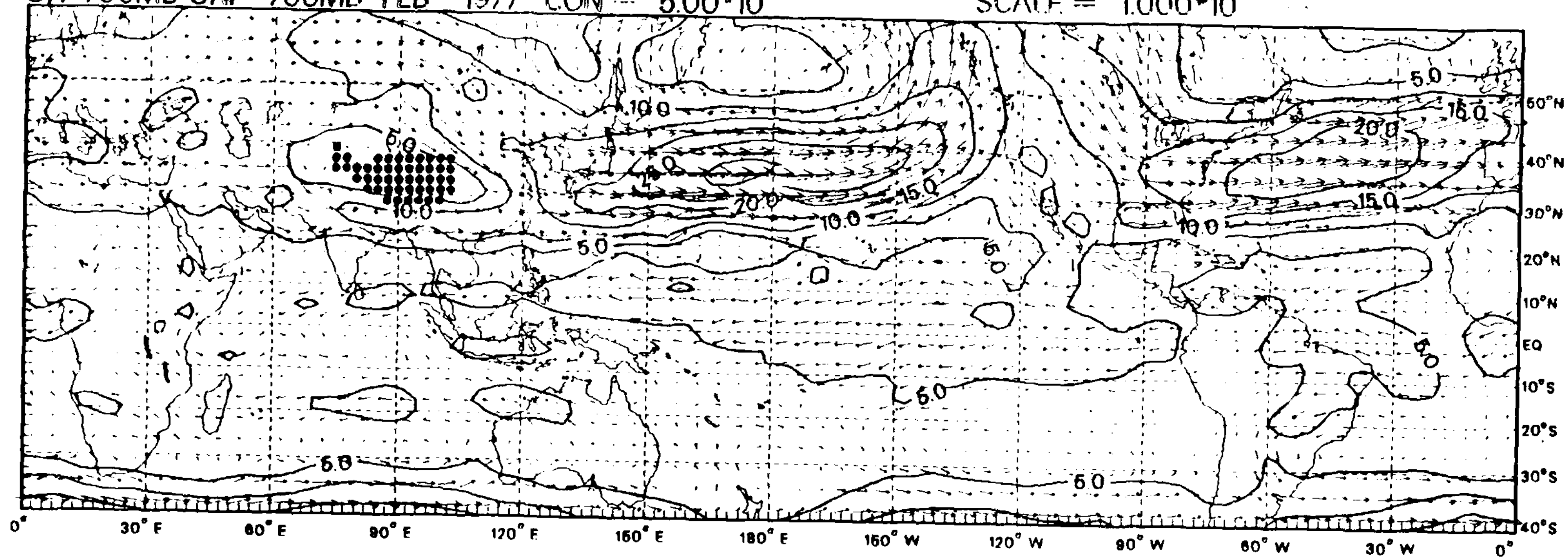

PSI 7677 UNF 700MB JAN 1977 DEV CON = $2.00*10^{0}$



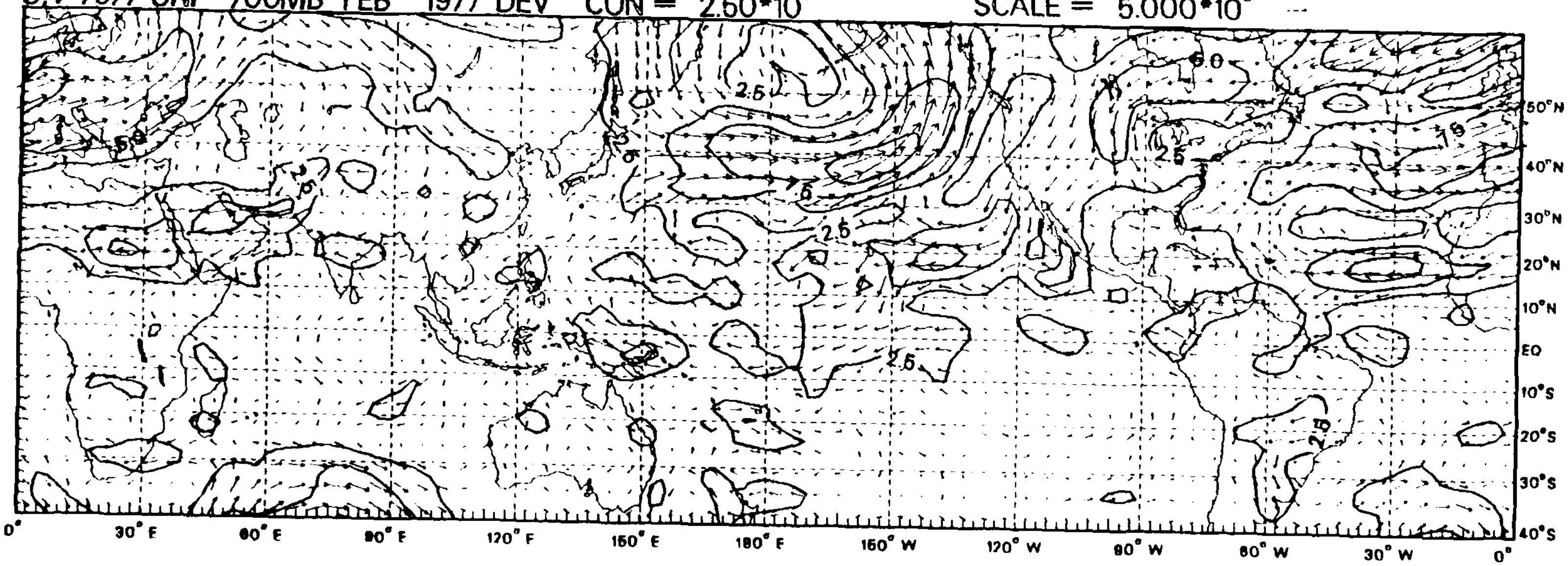

CHI UD,VD 700MB UNF 700MB JAN 1977 CON = 1.00*10^0 SCALE = 2.000*10^0
60°N
40°N
30°N
20°N
10°N
EQ
10°S
20°S
30°S
40°S
0° 30° E 60° E 90° E 120° E 150° E 180° E 150° W 120° W 90° W 60° W 30° W 0°


CHI UD,VD 7677 UNF 700MB JAN 1977 DEV CON = 5.00*10^-1 SCALE = 1.000*10^0
60°N
40°N
30°N
20°N
10°N
EQ
10°S
20°S
30°S
40°S
0° 30° E 60° E 90° E 120° E 150° E 180° E 150° W 120° W 90° W 60° W 30° W 0°

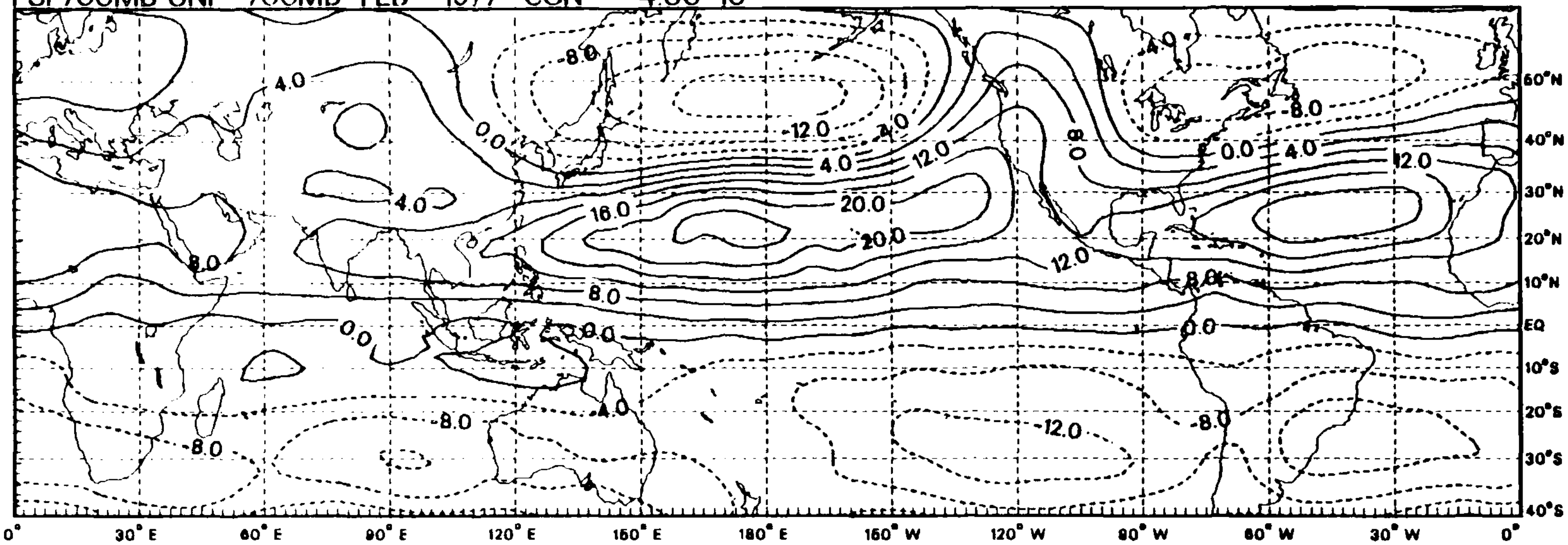
U,V 700MB UNF 700MB FEB 1977 CON = 5.00*10⁰ SCALE = 1.000*10¹



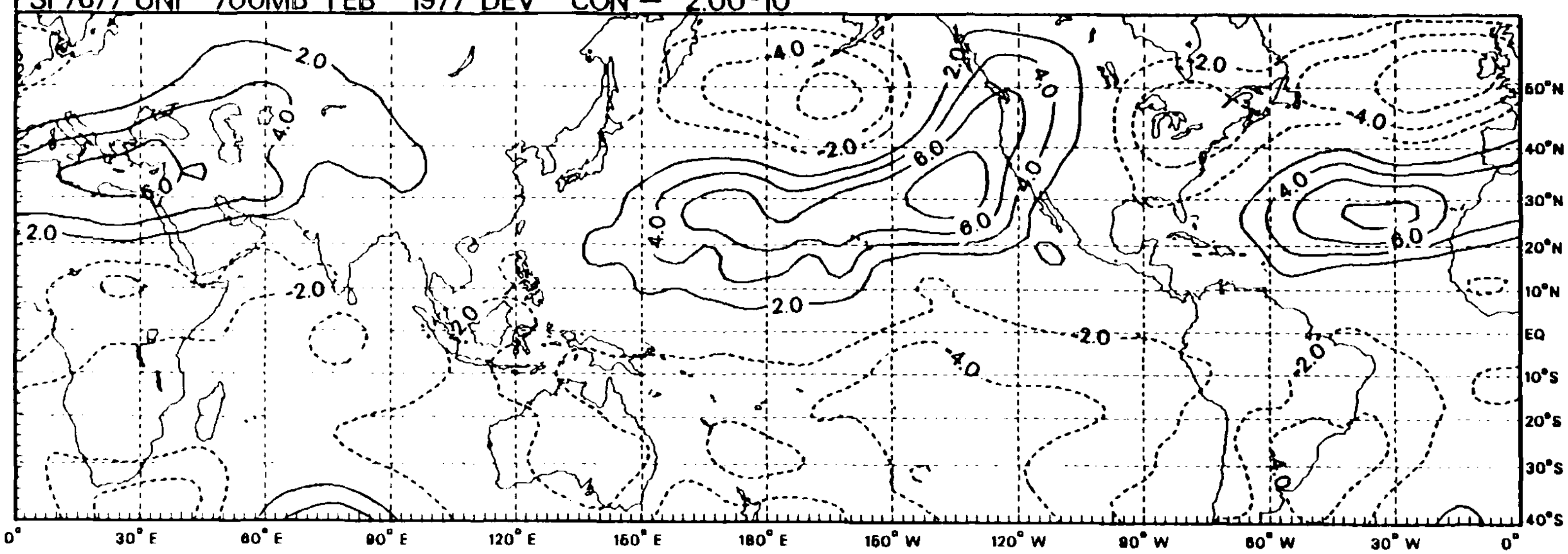

U,V 7677 UNF 700MB FEB 1977 DEV CON = 2.50*10⁰ SCALE = 5.000*10⁰



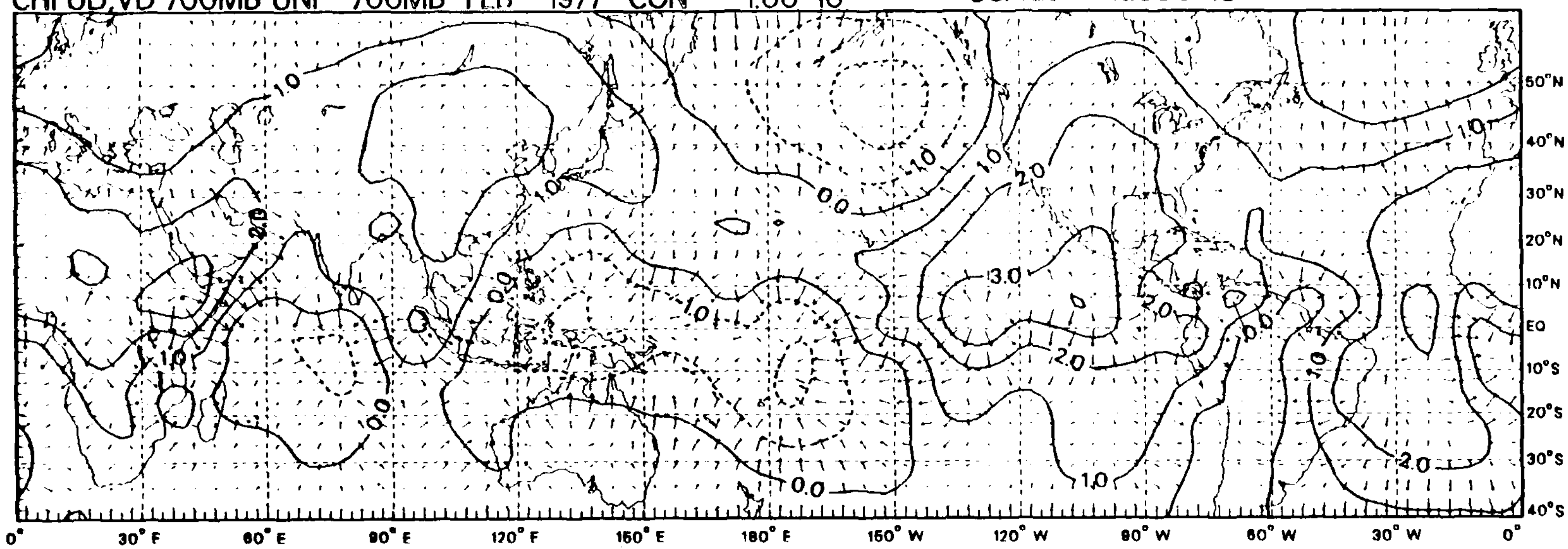
PSI 700MB UNF 700MB FEB 1977 CON = 4.00*10$^0$



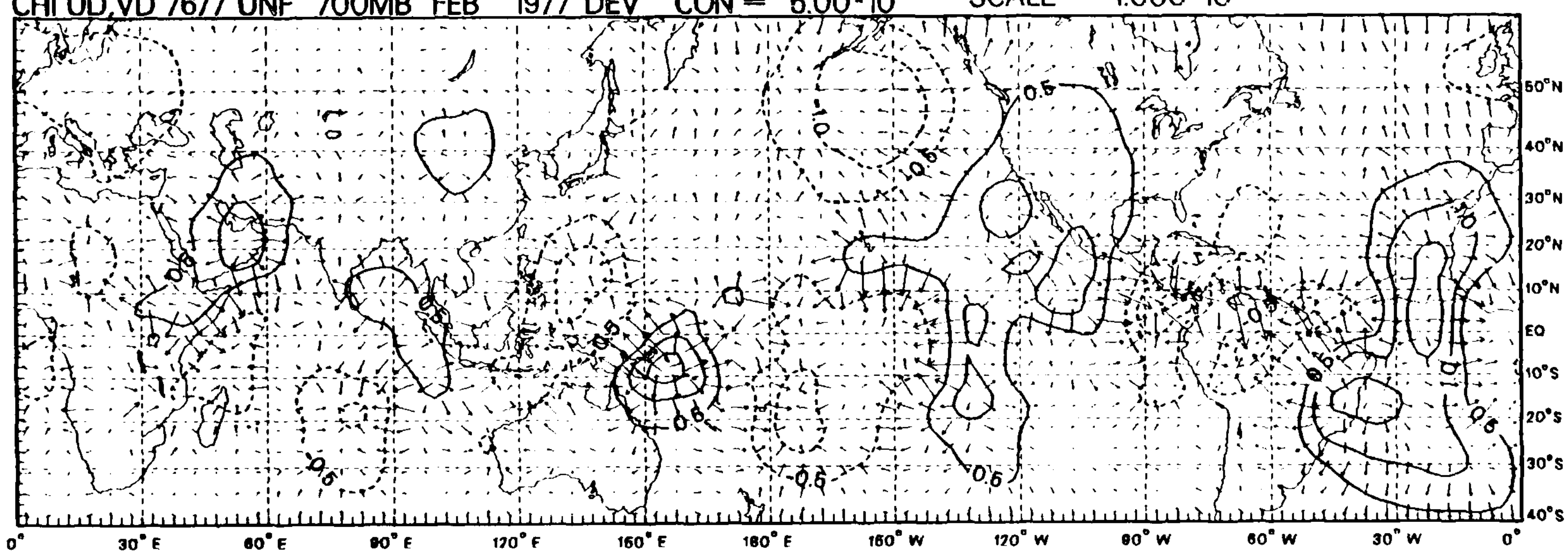
PSI 7677 UNF 700MB FEB 1977 DEV CON = 2.00*10$^0$



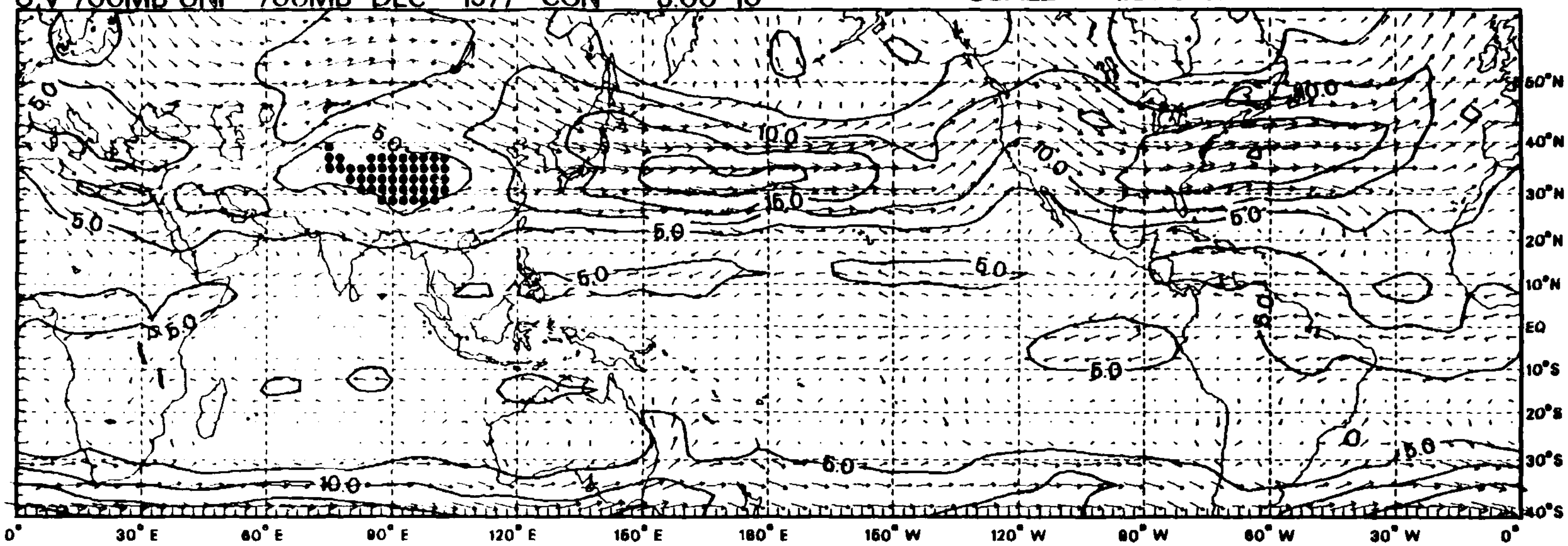
CHI UD,VD 700MB UNF 700MB FEB 1977 CON = $1.00*10^{0}$ SCALE = $2.000*10^{0}$



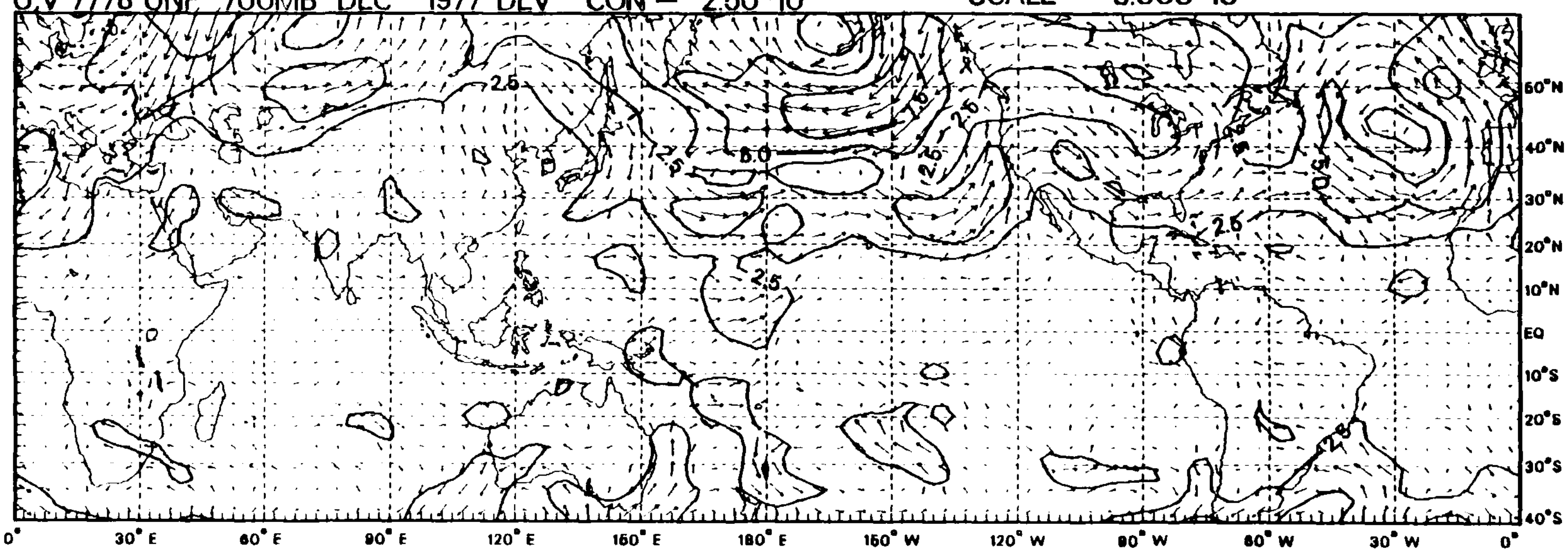

CHI UD,VD 7677 UNF 700MB FEB 1977 DEV CON = $5.00*10^{-1}$ SCALE = $1.000*10^{0}$



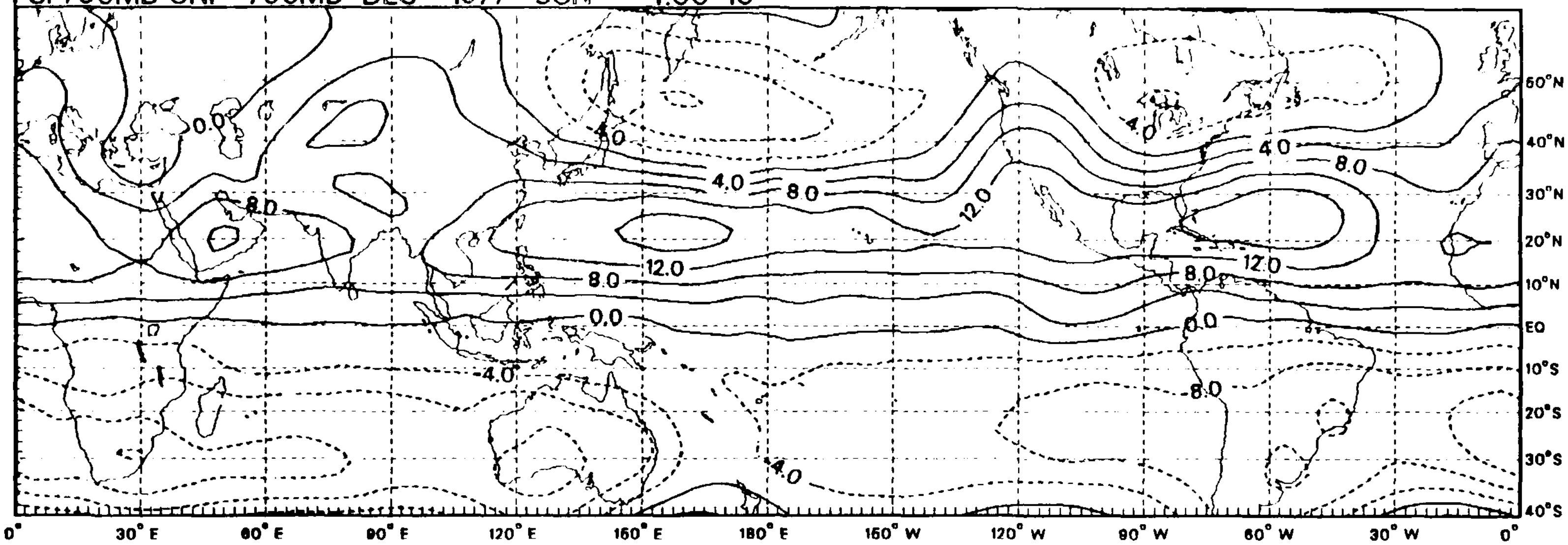
U.V 700MB UNF 700MB DEC 1977 CON = 5.00*10^0 SCALE = 1.000*10^1



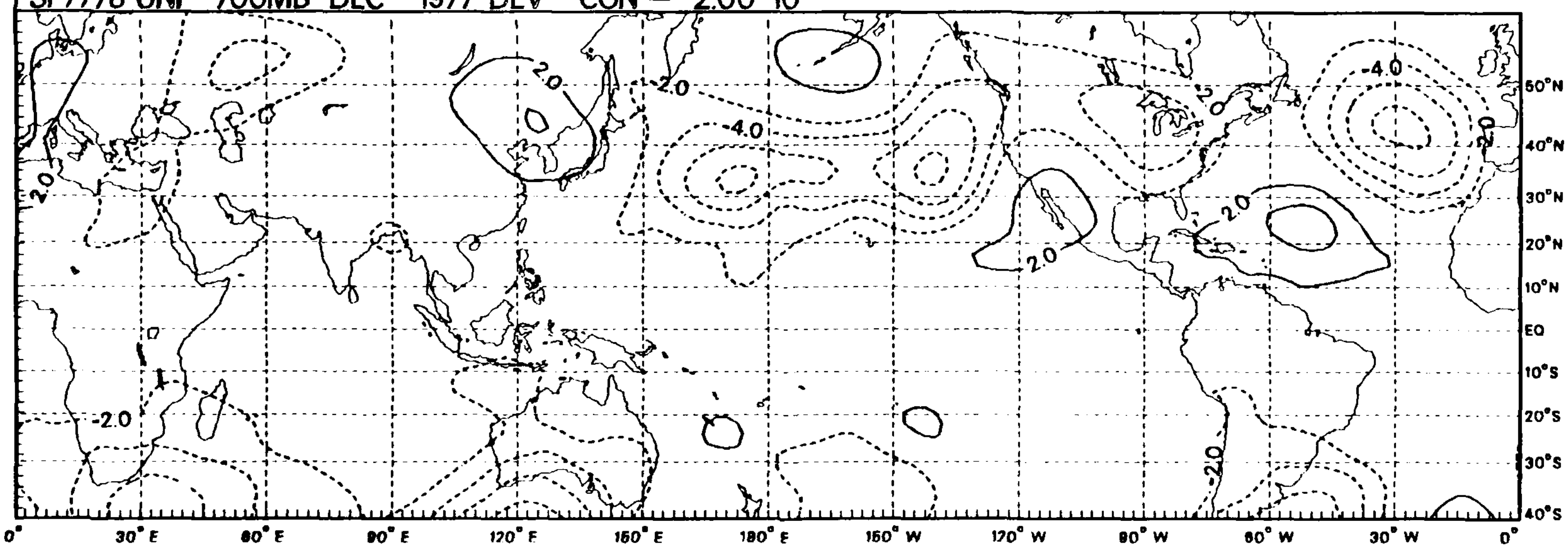

U.V 7778 UNF 700MB DEC 1977 DEV CON = 2.50*10^0 SCALE = 5.000*10^0



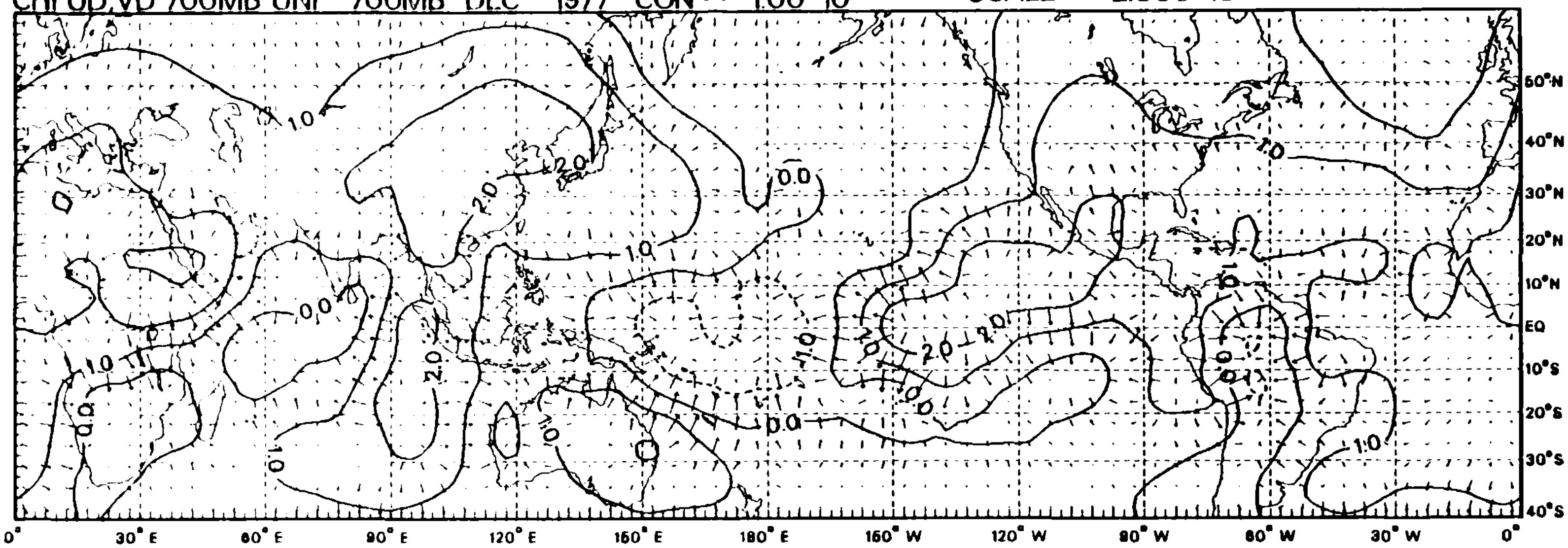
PSI 700MB UNF 700MB DEC 1977 CON = 4.00*10$^0$



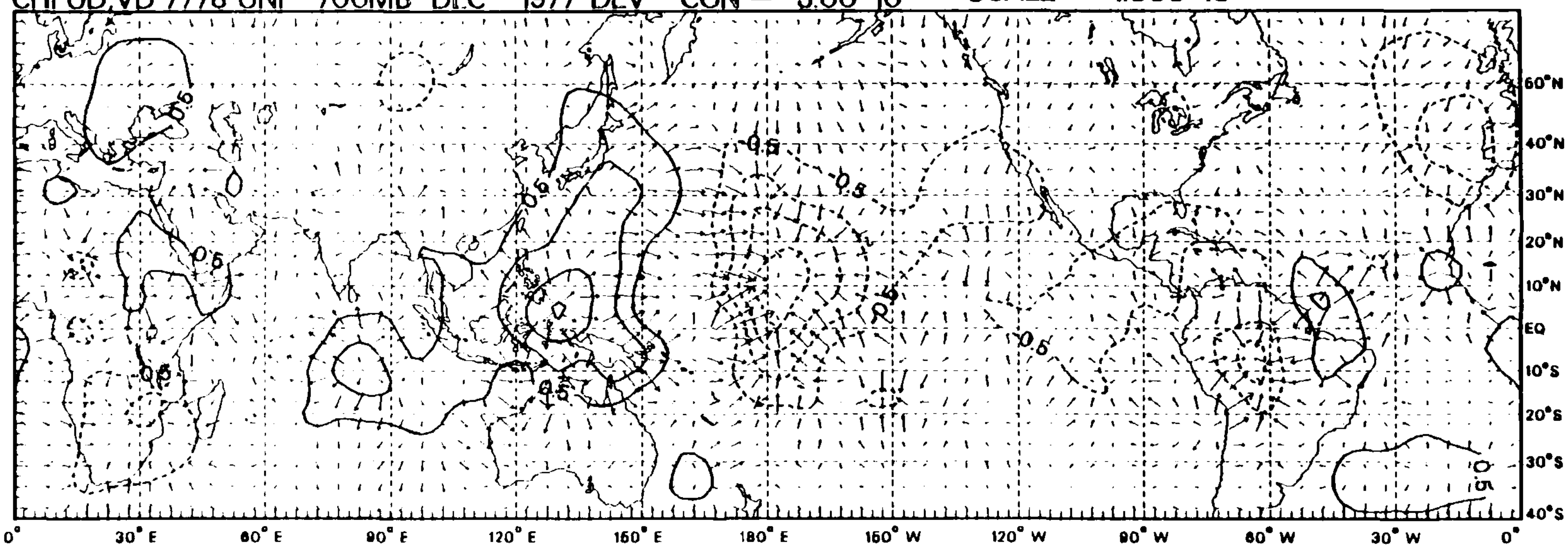

PSI 7778 UNF 700MB DEC 1977 DEV CON = 2.00*10$^0$



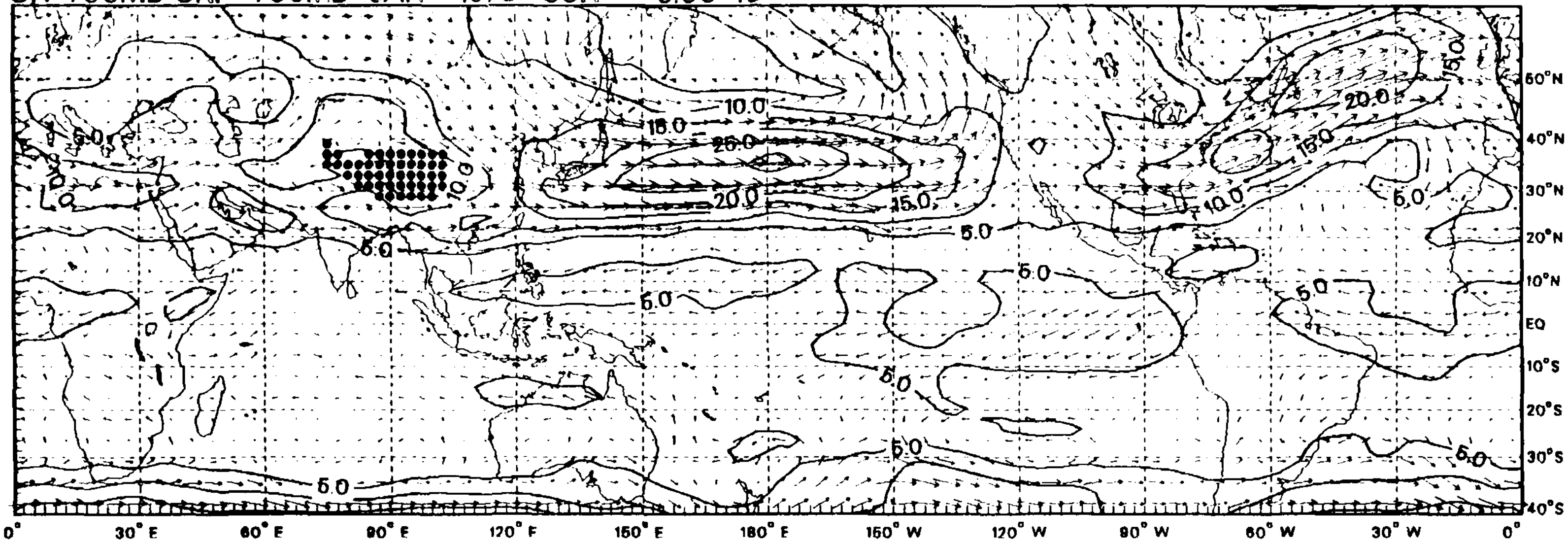
CHI UD,VD 700MB UNF 700MB DEC 1977 CON = $1.00*10^{0}$ SCALE = $2.000*10^{0}$



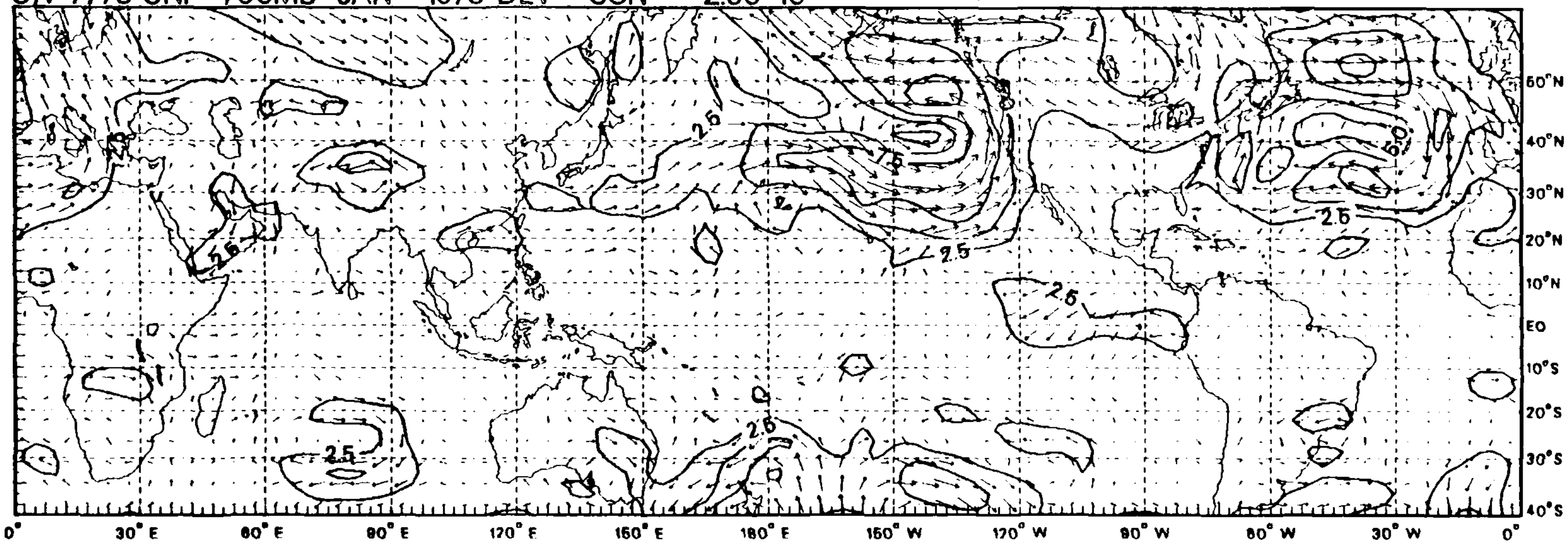

CHI UD,VD 7778 UNF 700MB DEC 1977 DEV CON = $5.00*10^{-1}$ SCALE = $1.000*10^{0}$



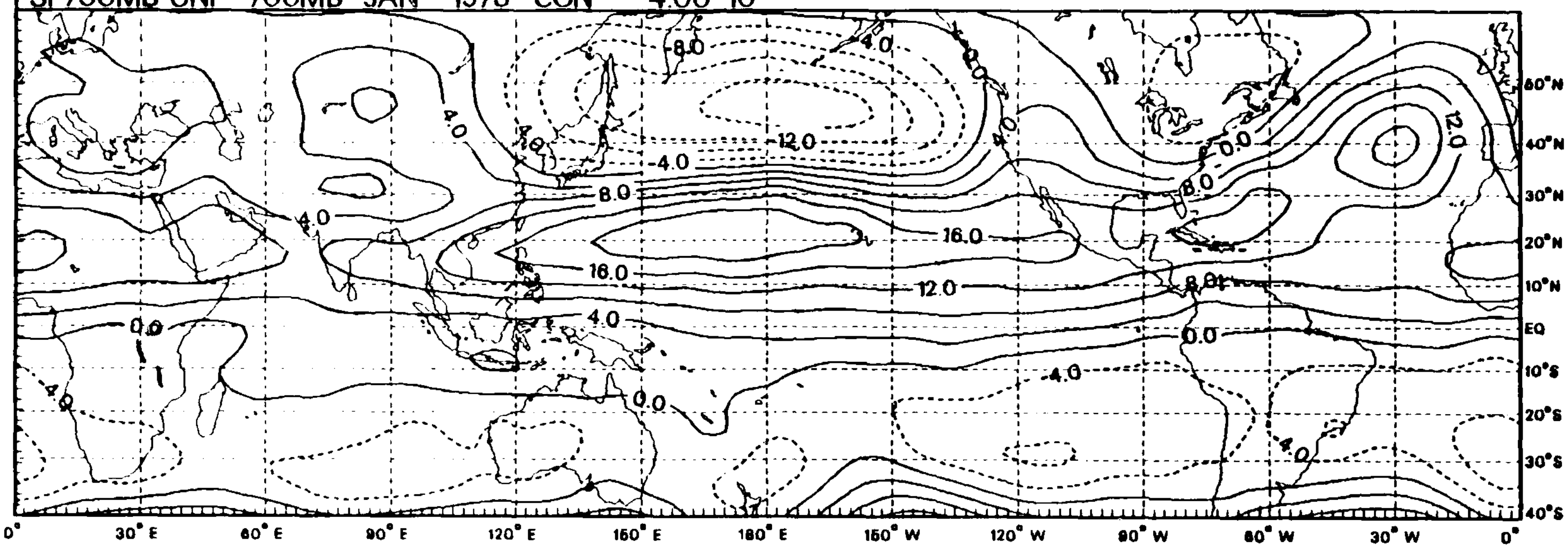
U,V 700MB UNF 700MB JAN 1978 CON = 5.00*10^0 SCALE = 1.000*10^1



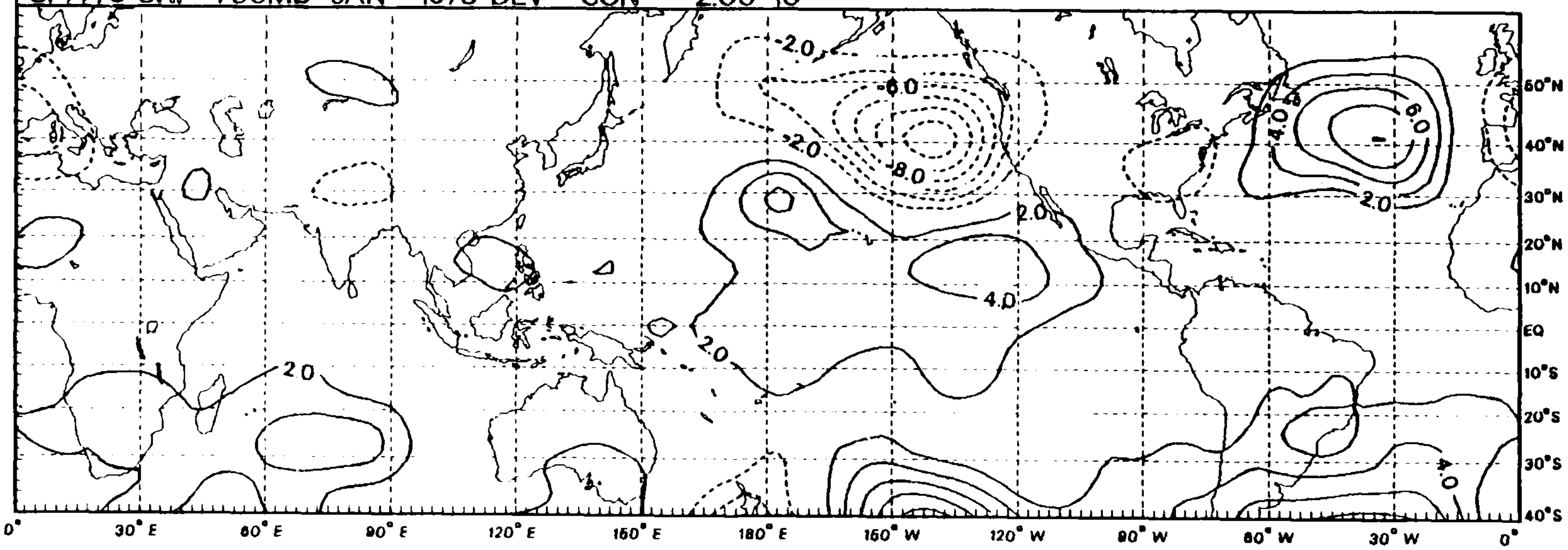
U,V 7778 UNF 700MB JAN 1978 DEV CON = 2.50*10^0 SCALE = 5.000*10^0



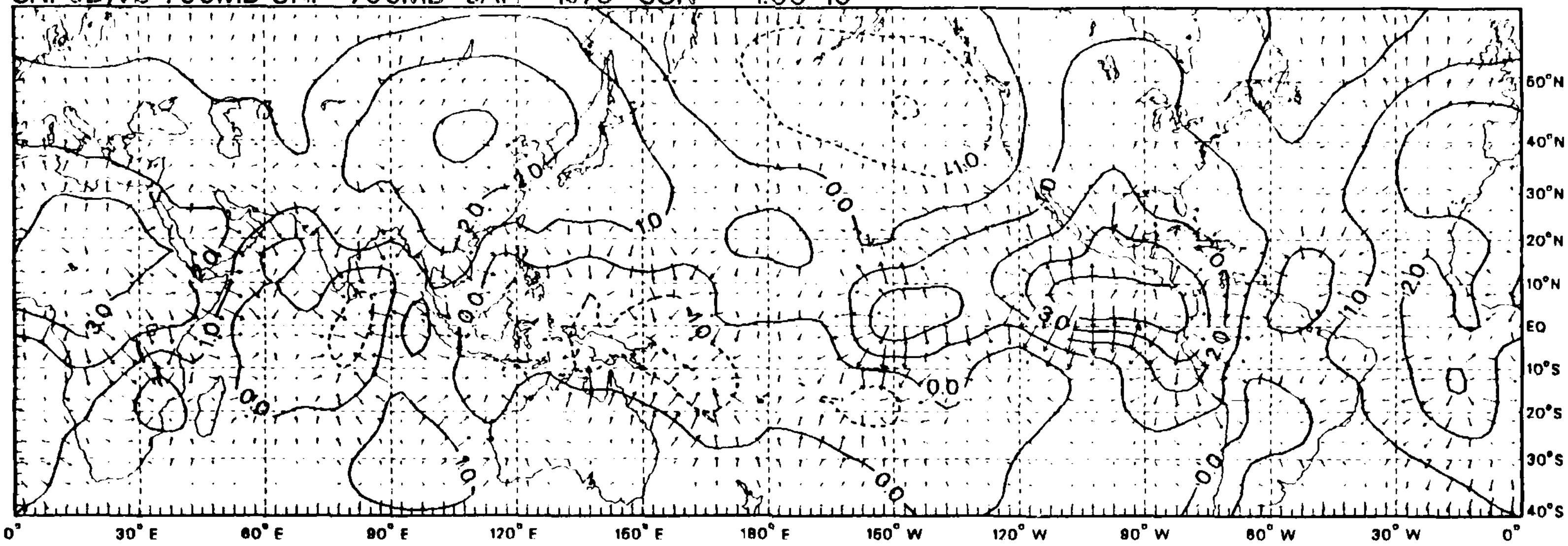
PSI 700MB UNF 700MB JAN 1978 CON = 4.00*10$^{0}$



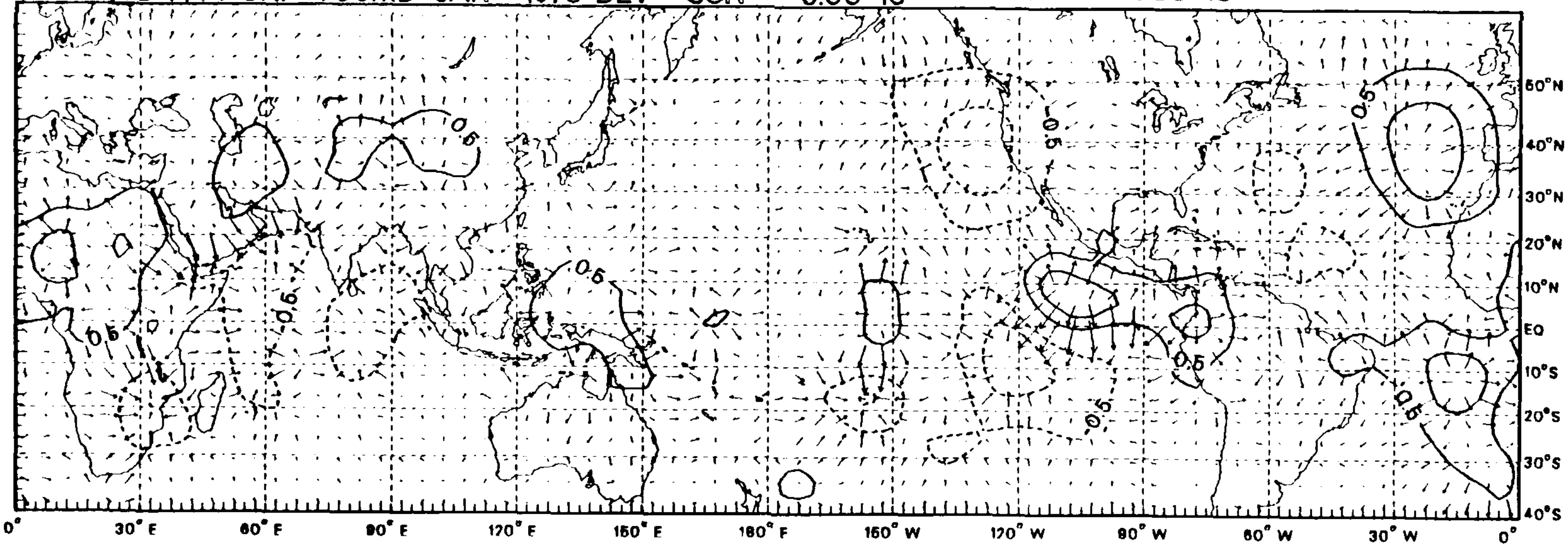

PSI 7778 UNF 700MB JAN 1978 DEV CON = 2.00*10$^{0}$



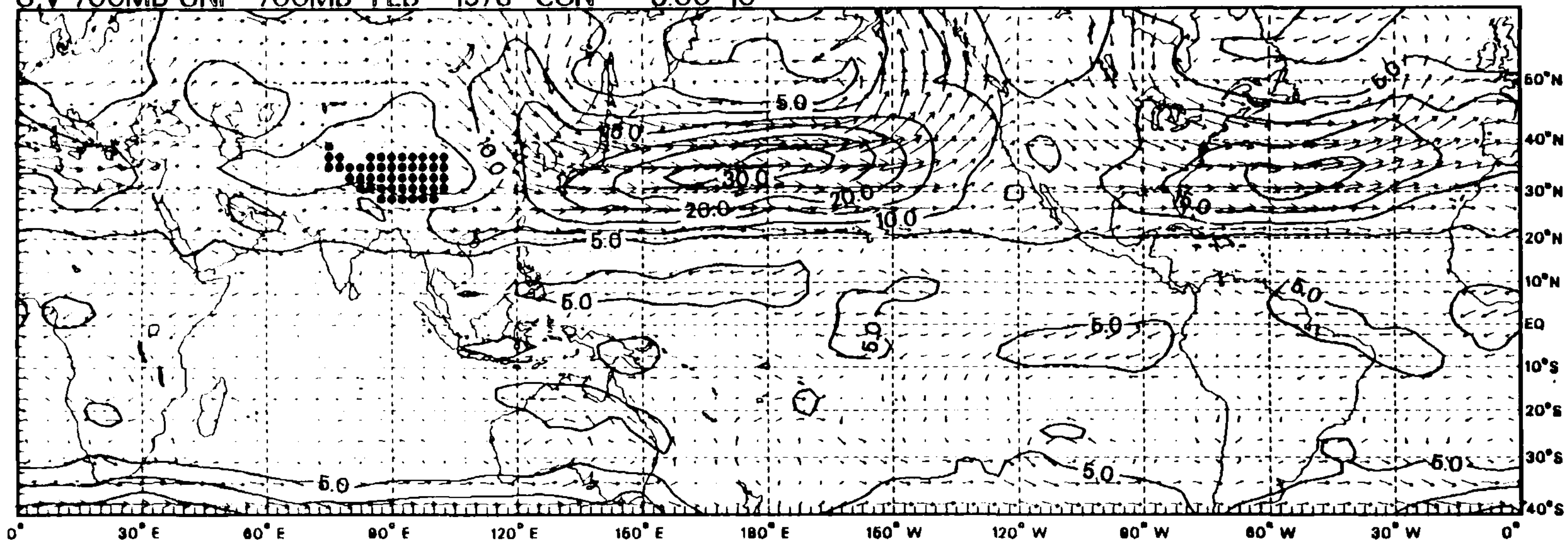
CHI UD,VD 700MB UNF 700MB JAN 1978 CON = $1.00*10^{0}$ SCALE = $2.000*10^{0}$



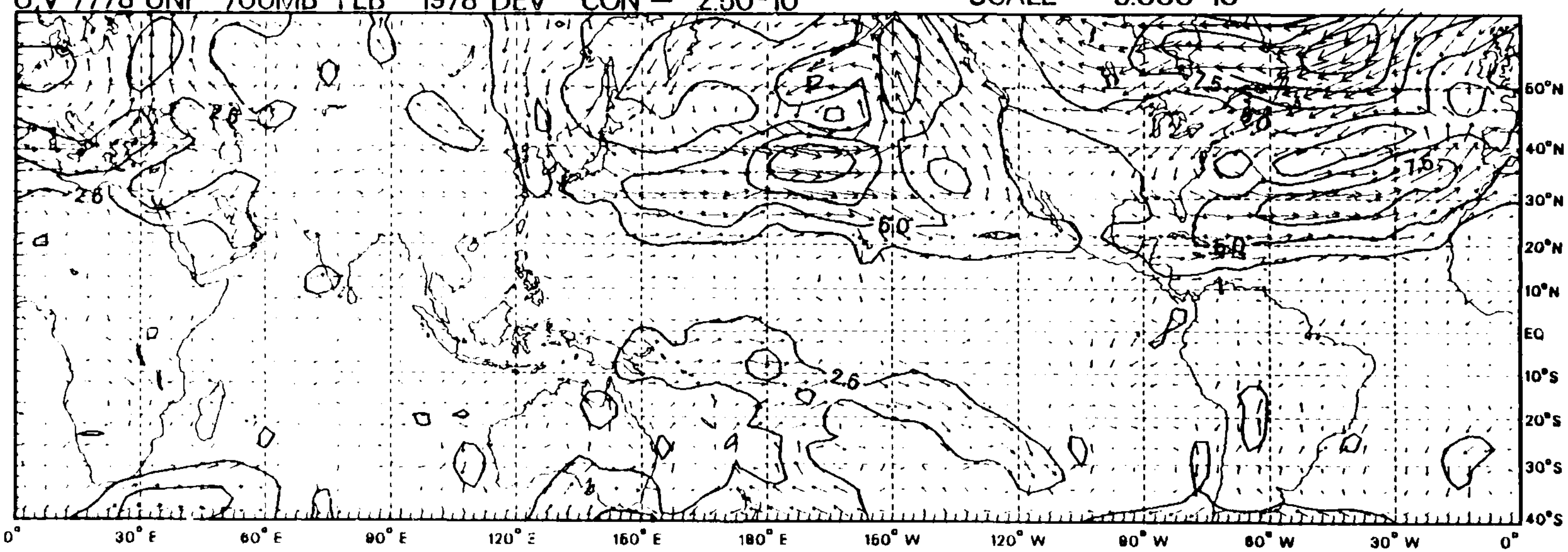

CHI UD,VD 7778 UNF 700MB JAN 1978 DEV CON = $5.00*10^{-1}$ SCALE = $1.000*10^{0}$



U,V 700MB UNF 700MB FEB 1978 CON = 5.00*10^0 SCALE = 1.000*10^1

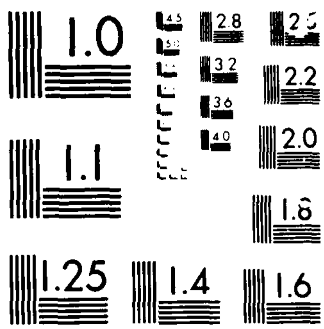


U,V 7778 UNF 700MB FEB 1978 DEV CON = 2.50*10^0 SCALE = 5.000*10^0



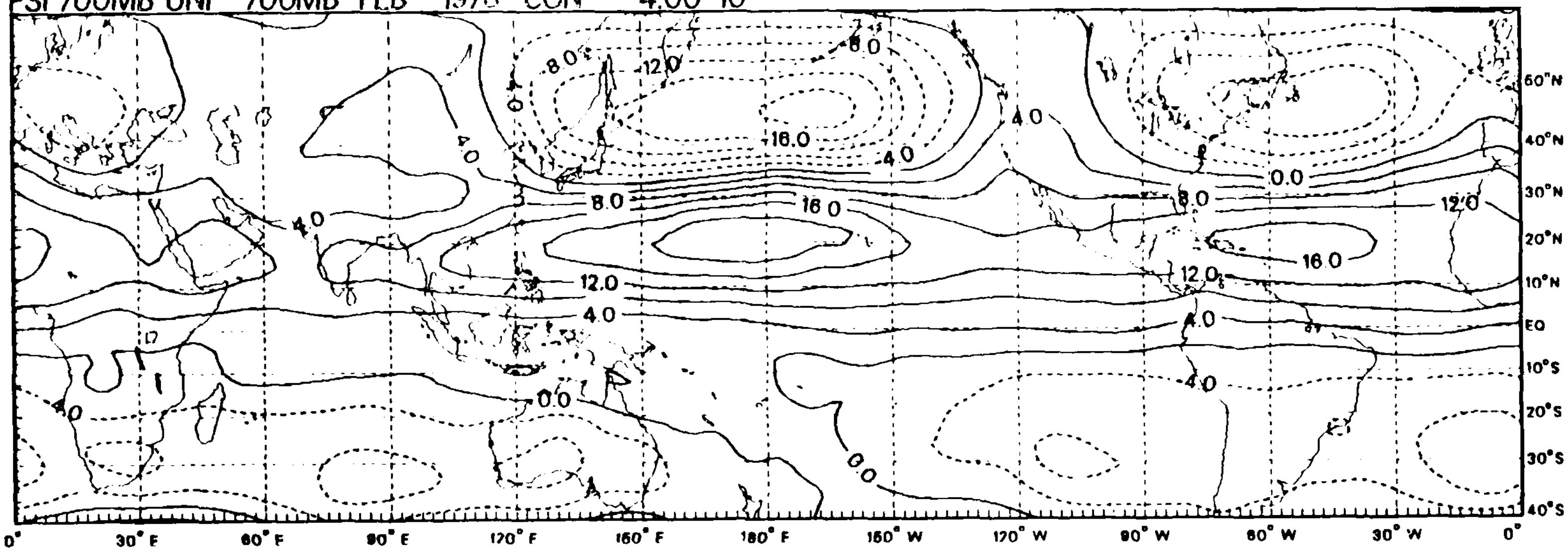
AD-A168 837 MONTHLY AND SEASONAL CLIMATOLOGY OF THE NORTHERN WINTER 2/2
OVER THE GLOBAL T..(U) NAVAL POSTGRADUATE SCHOOL
MONTEREY CA J S BOYLE ET AL. MAY 86

UNCLASSIFIED NPS-63-86-003-VOL-4 F/G 4/2 NL

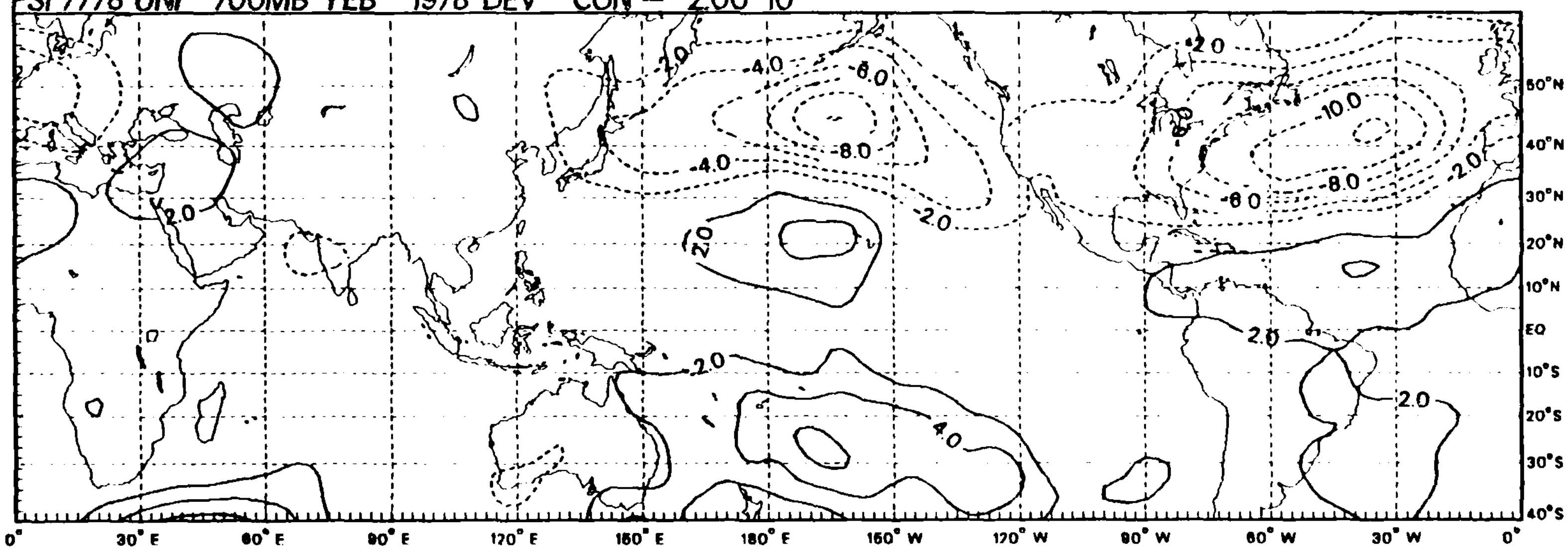



MICROCOP' CHART

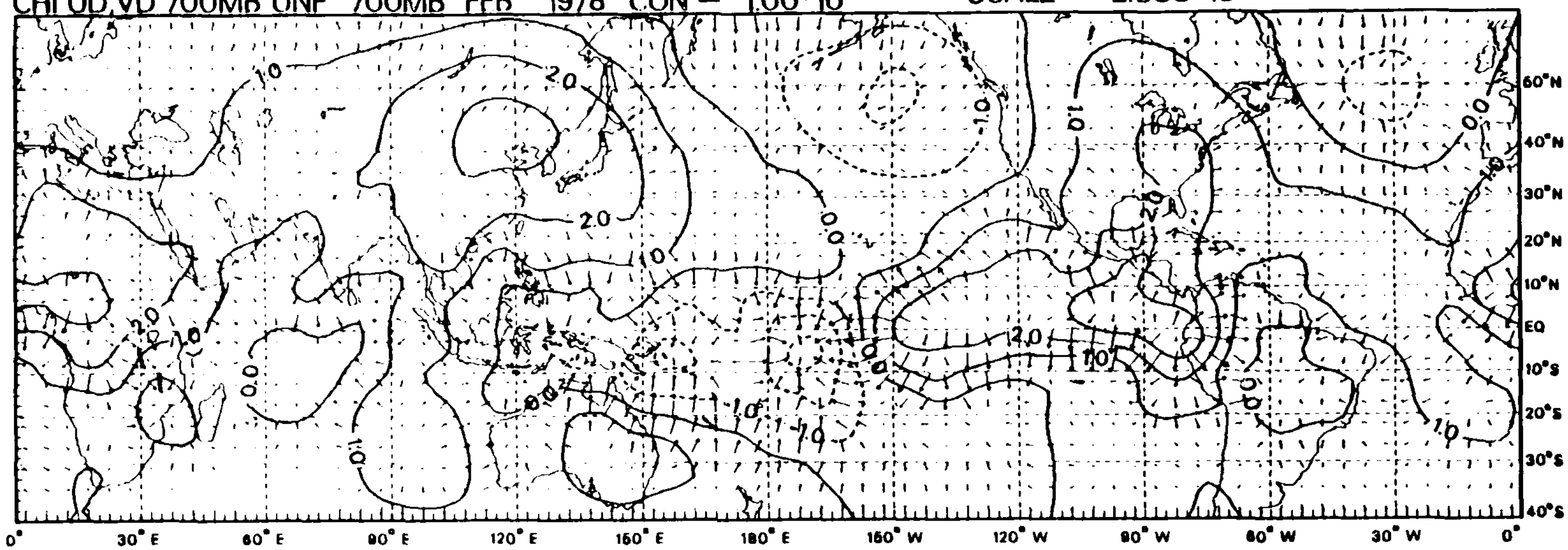
PSI 700MB UNF 700MB FEB 1978 CON = $4.00*10^0$



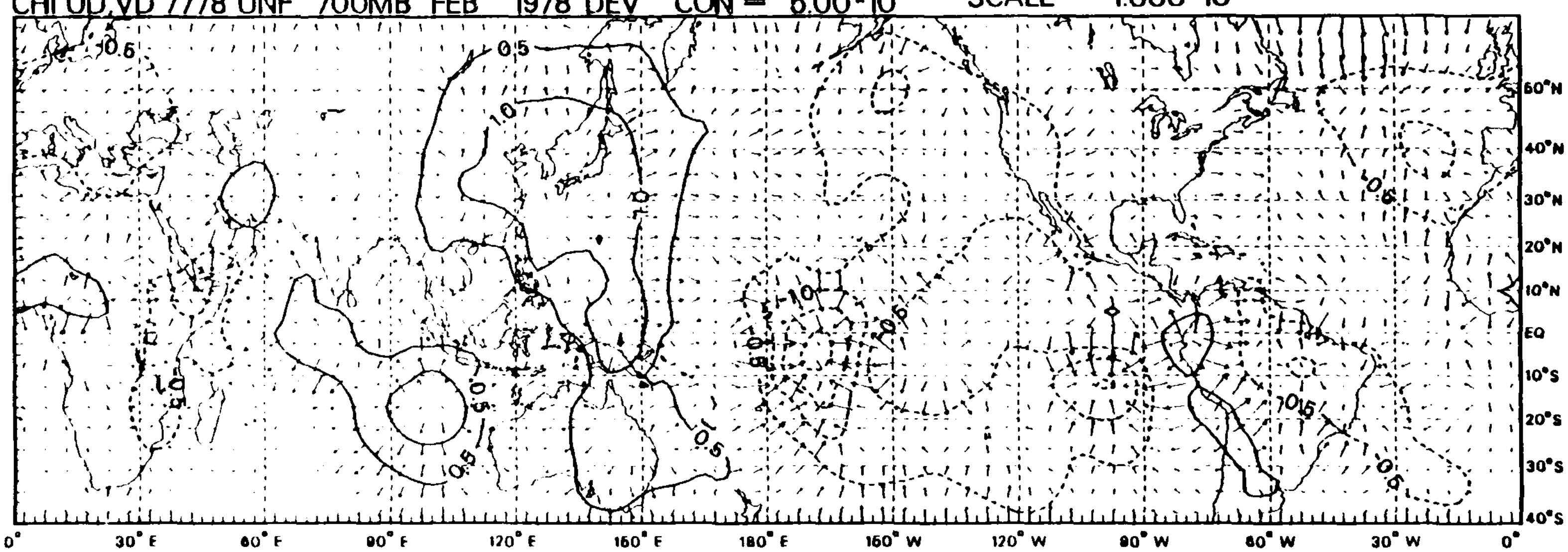

PSI 7778 UNF 700MB FEB 1978 DEV CON = $2.00*10^0$



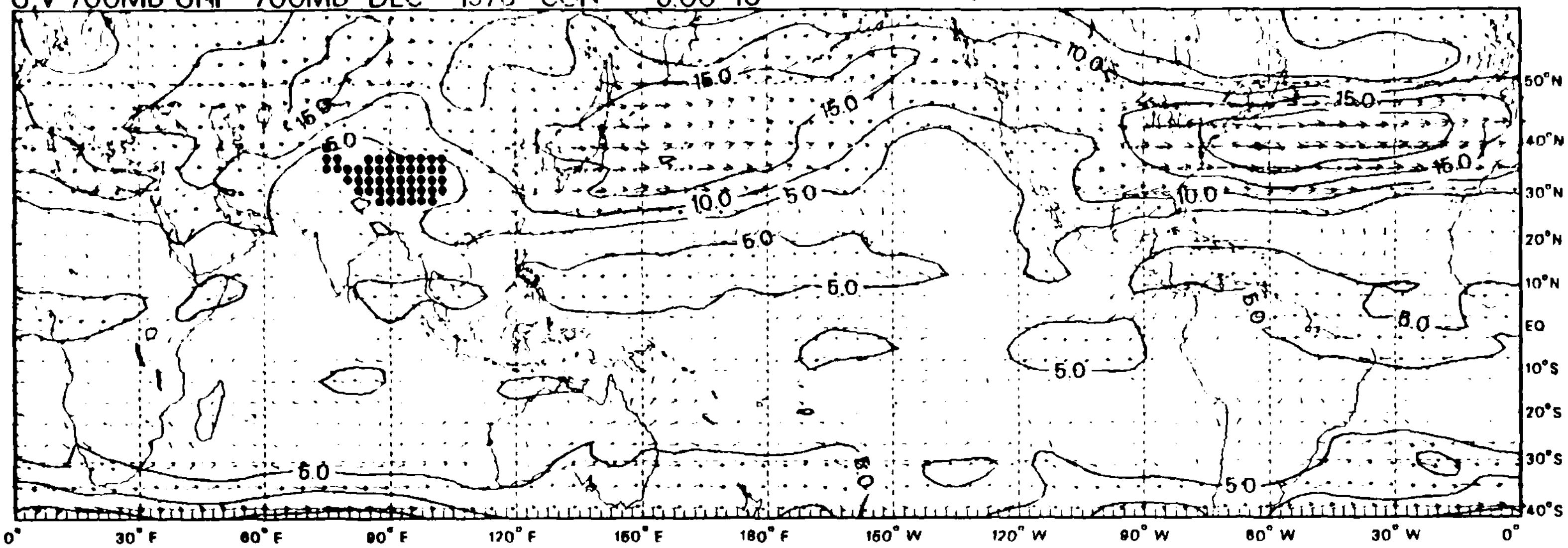
CHI UD,VD 700MB UNF 700MB FEB 1978 CON = 1.00*10^0 SCALE = 2.000*10^0



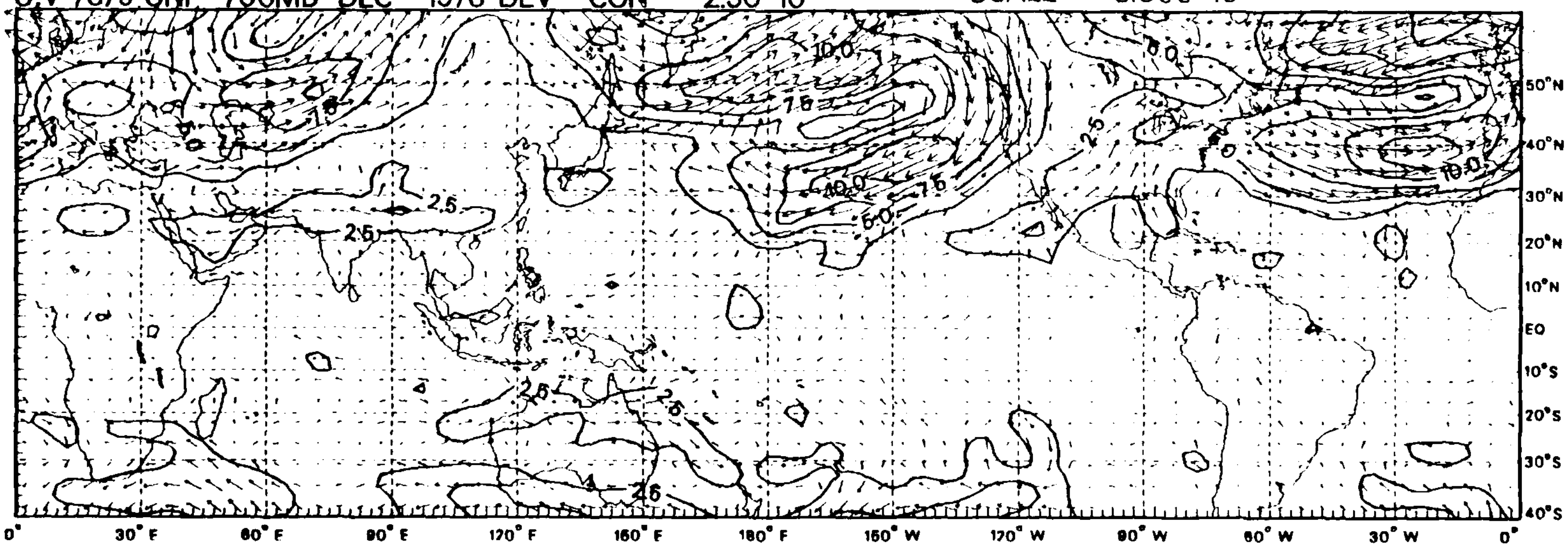

CHI UD,VD 7778 UNF 700MB FEB 1978 DEV CON = 5.00*10^-1 SCALE = 1.000*10^0



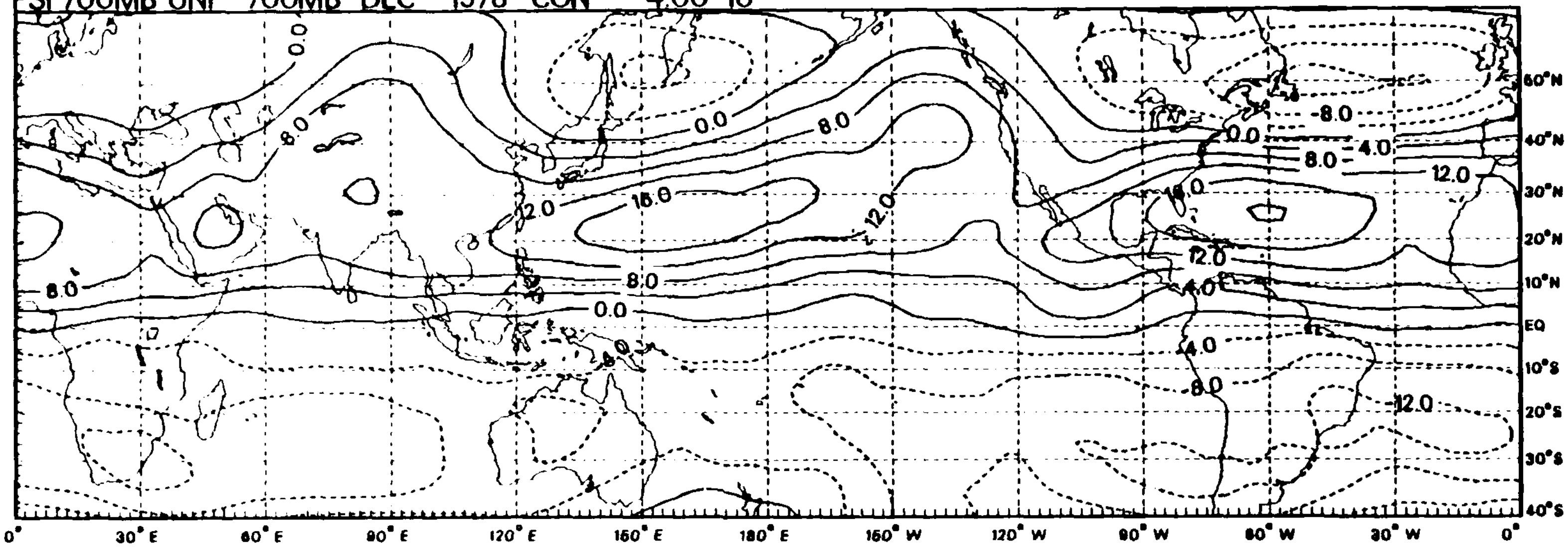
U,V 700MB UNF 700MB DEC 1978 CON = $5.00*10^{0}$ SCALE = $1.000*10^{1}$



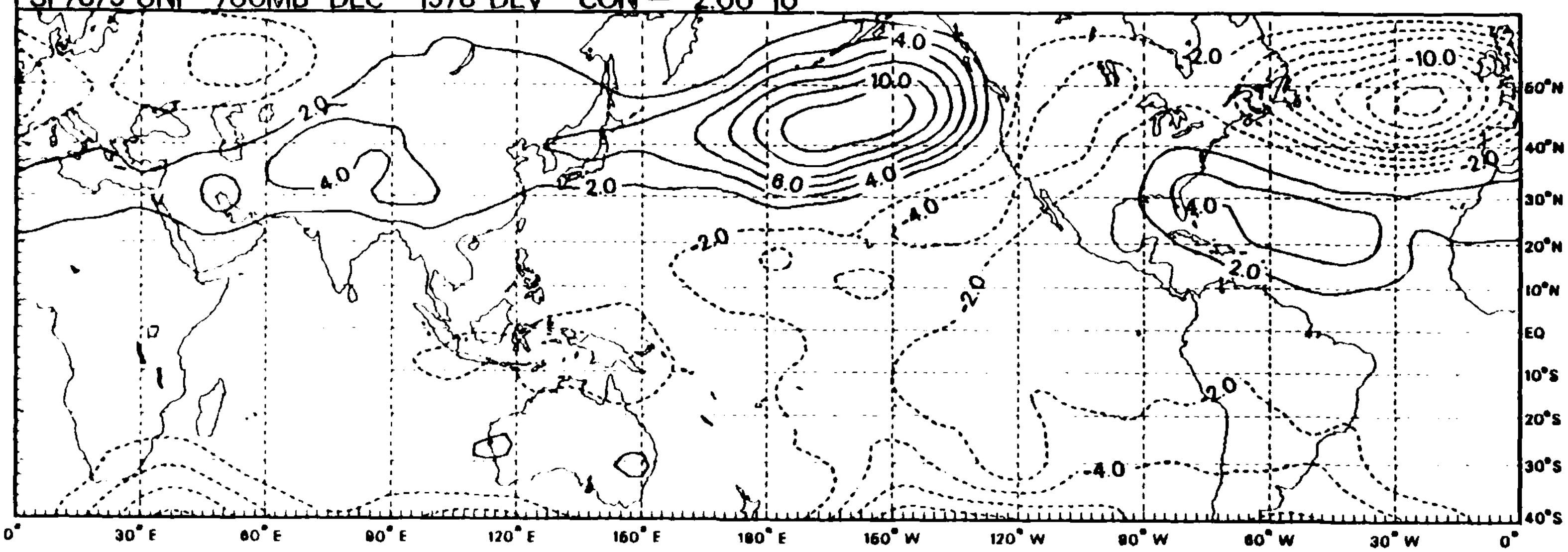

U,V 7879 UNF 700MB DEC 1978 DEV CON = $2.50*10^{0}$ SCALE = $5.000*10^{0}$



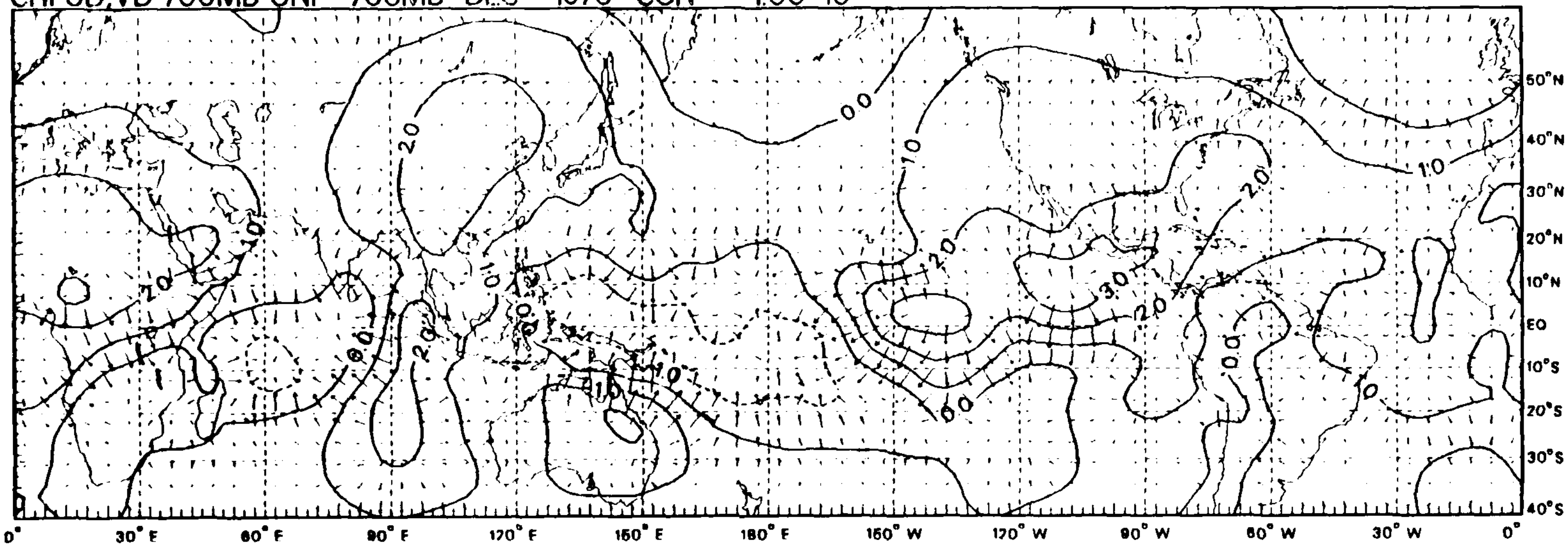
PSI 700MB UNF 700MB DEC 1978 CON = 4.00*10⁰



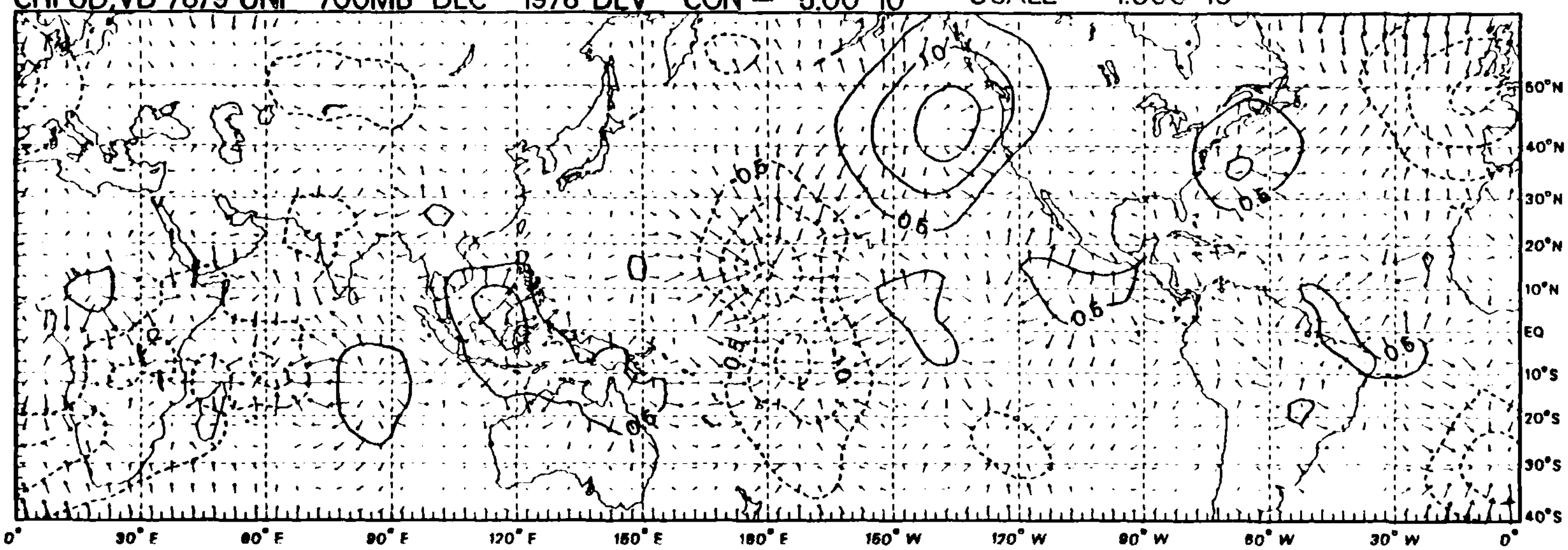

PSI 7879 UNF 700MB DEC 1978 DEV CON = 2.00*10⁰



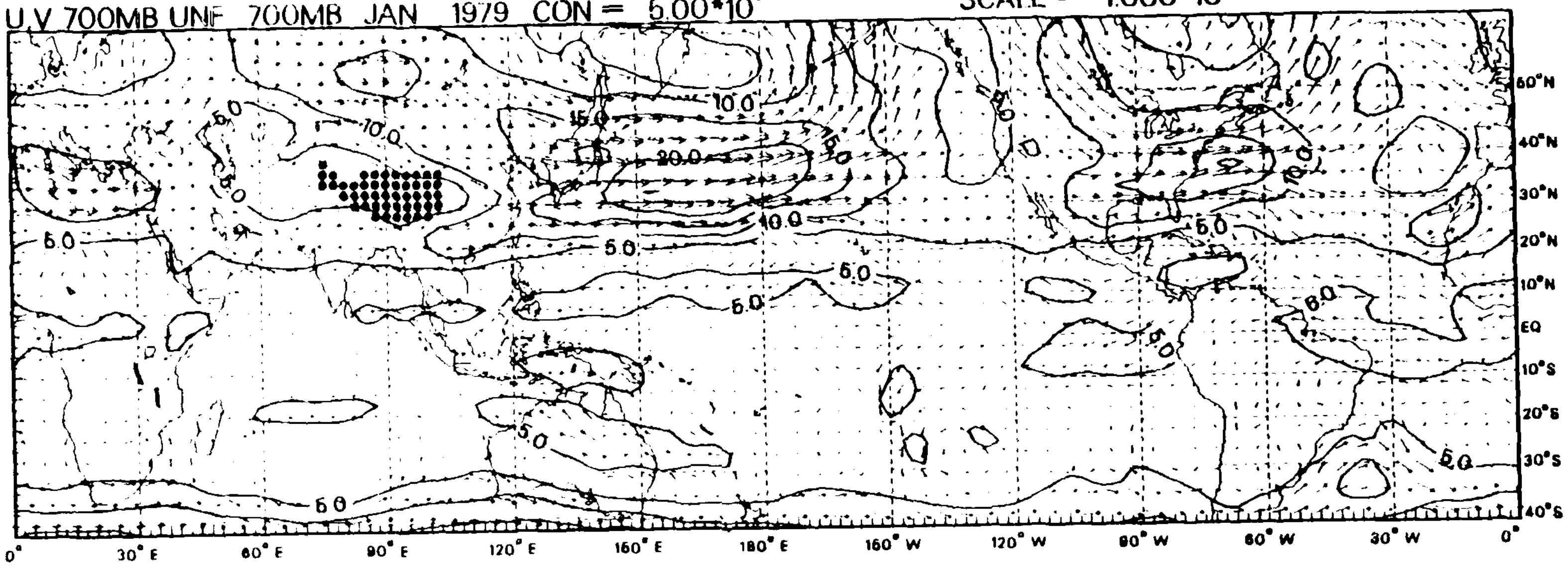
CHI UD,VD 700MB UNF 700MB DEC 1978 CON = 1.00*10^0 SCALE = 2.000*10^0



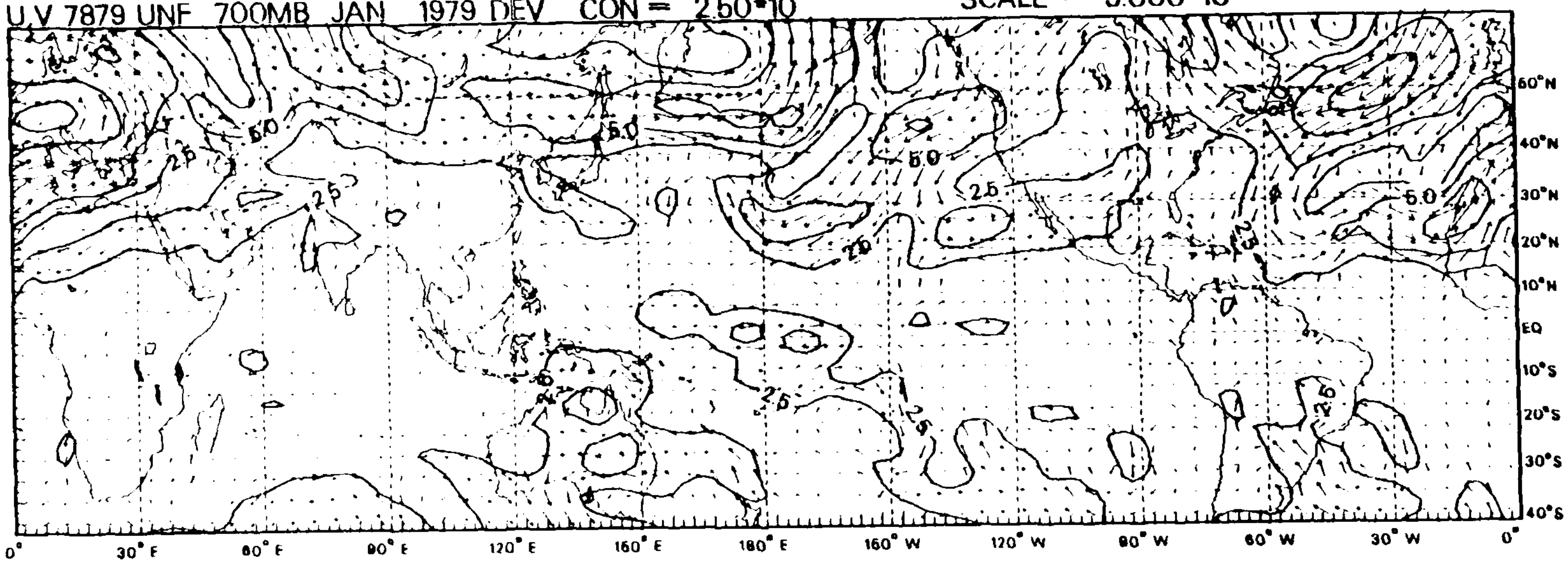

CHI UD,VD 7879 UNF 700MB DEC 1978 DEV CON = 5.00*10^-1 SCALE = 1.000*10^0



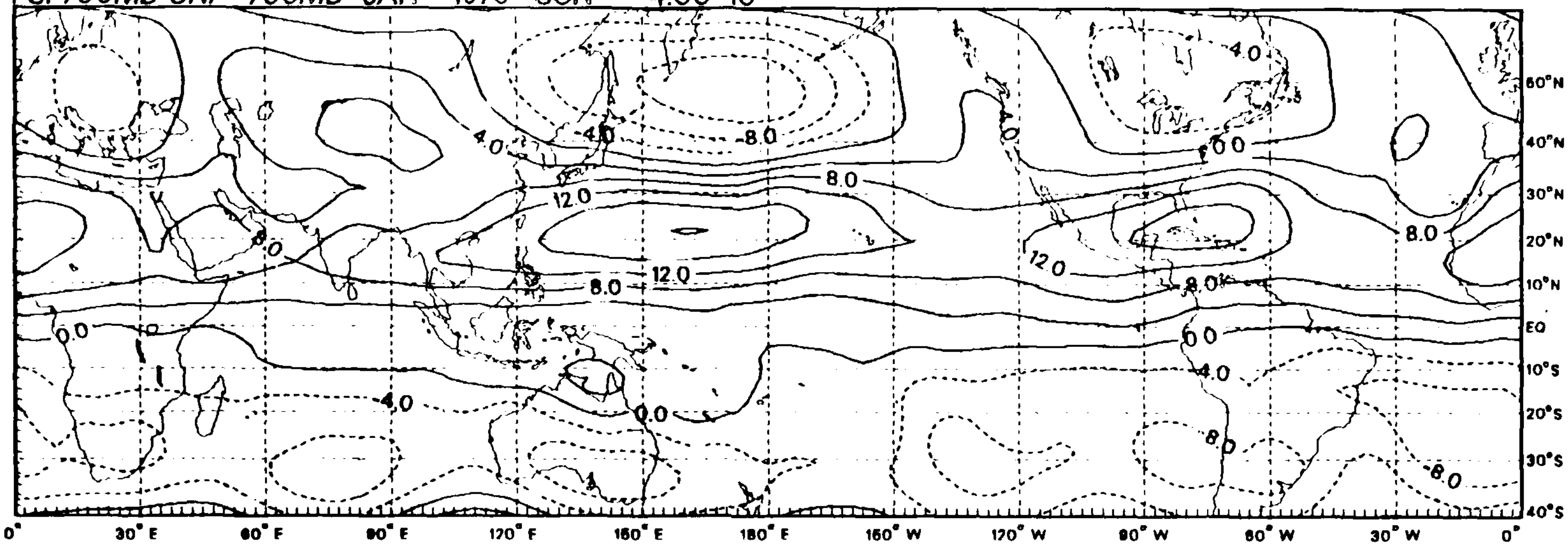
U,V 700MB UNF 700MB JAN 1979 CON = 5.00*10$^0$ SCALE = 1.000*10$^1$



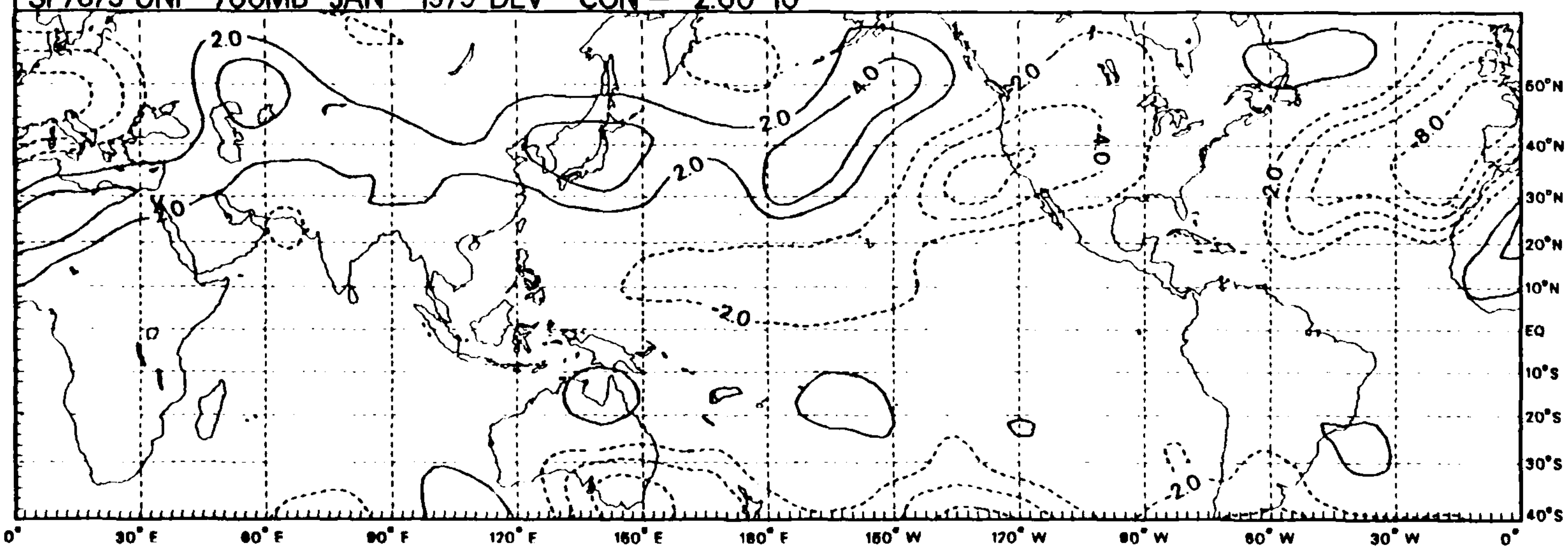

U,V 7879 UNF 700MB JAN 1979 DEV CON = 2.50*10$^0$ SCALE = 5.000*10$^0$



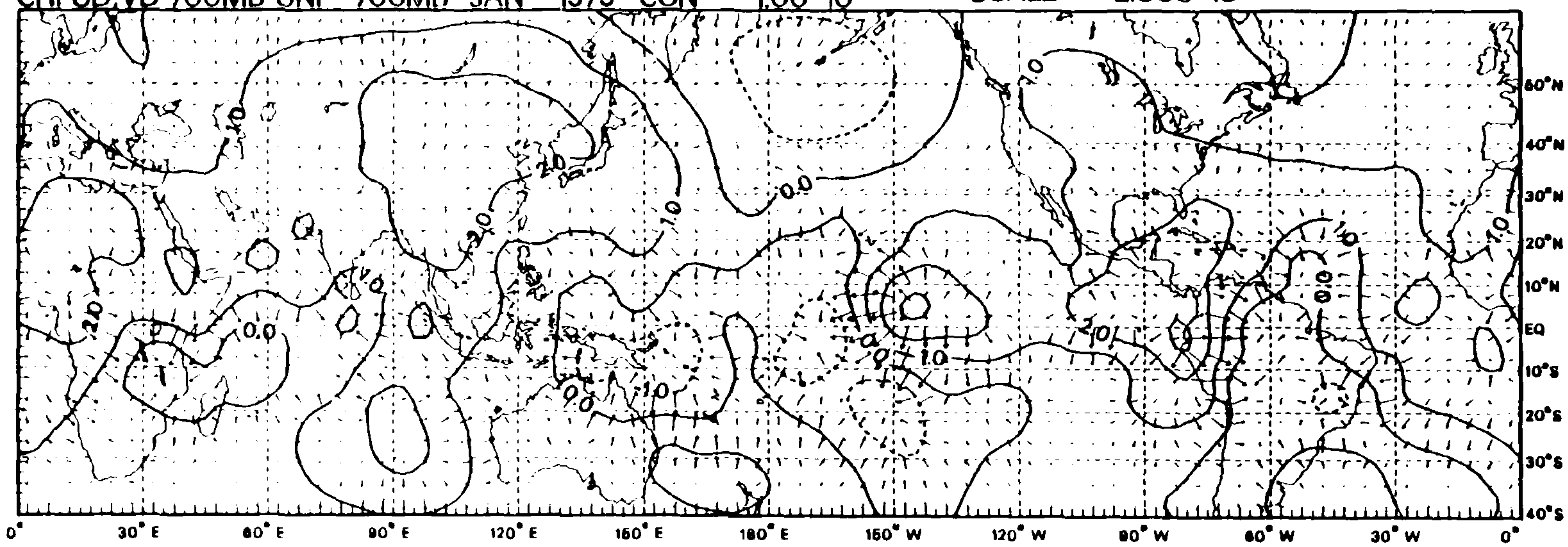
PSI 700MB UNF 700MB JAN 1979 CON = $4.00*10^{0}$



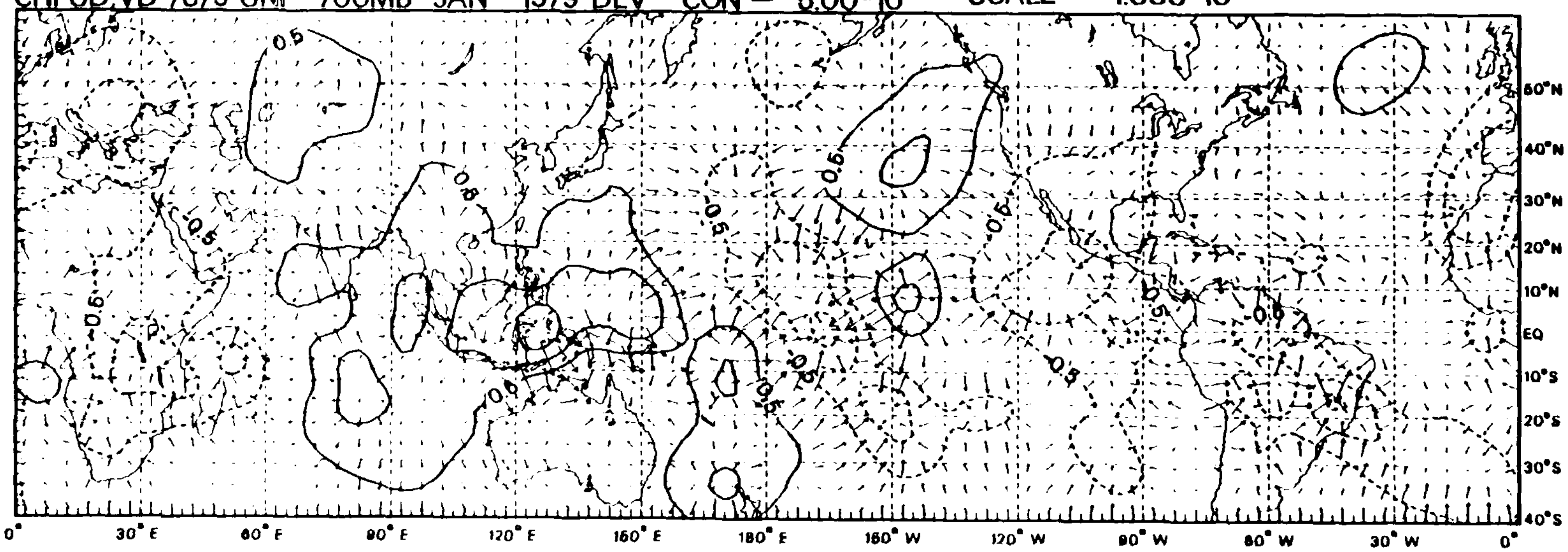

PSI 7879 UNF 700MB JAN 1979 DEV CON = $2.00*10^{0}$



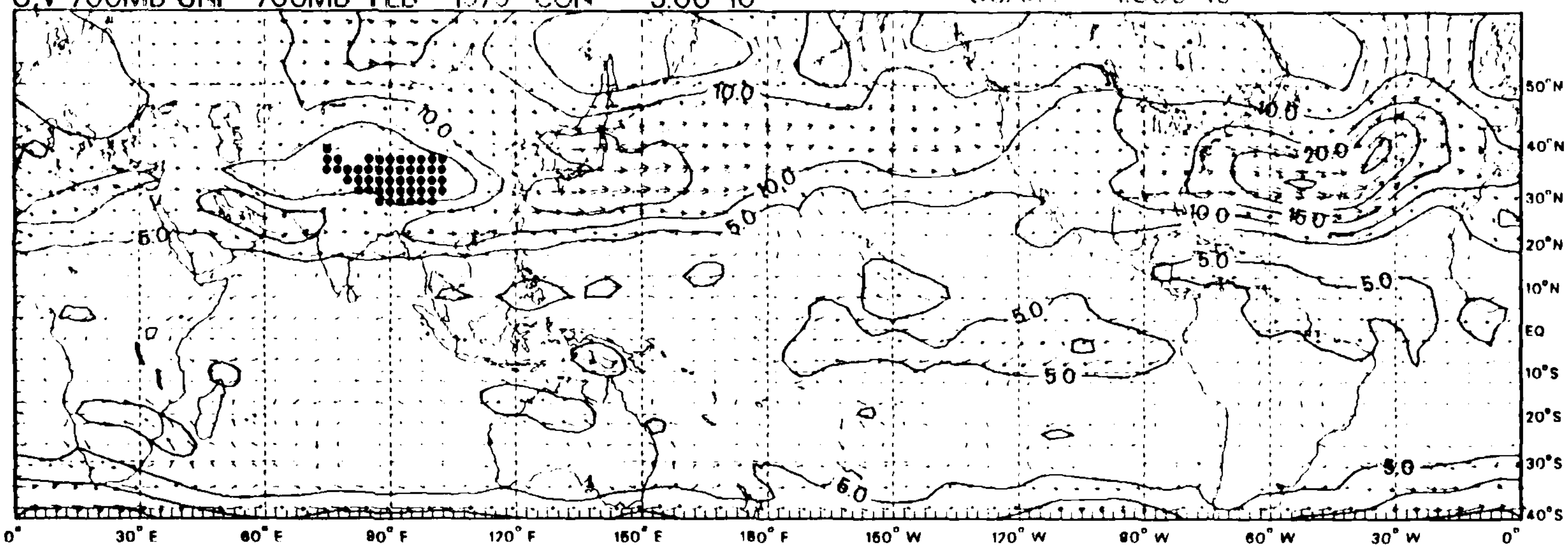
CHI UD,VD 700MB UNF 700MB JAN 1979 CON = $1.00*10^{0}$ SCALE = $2.000*10^{0}$



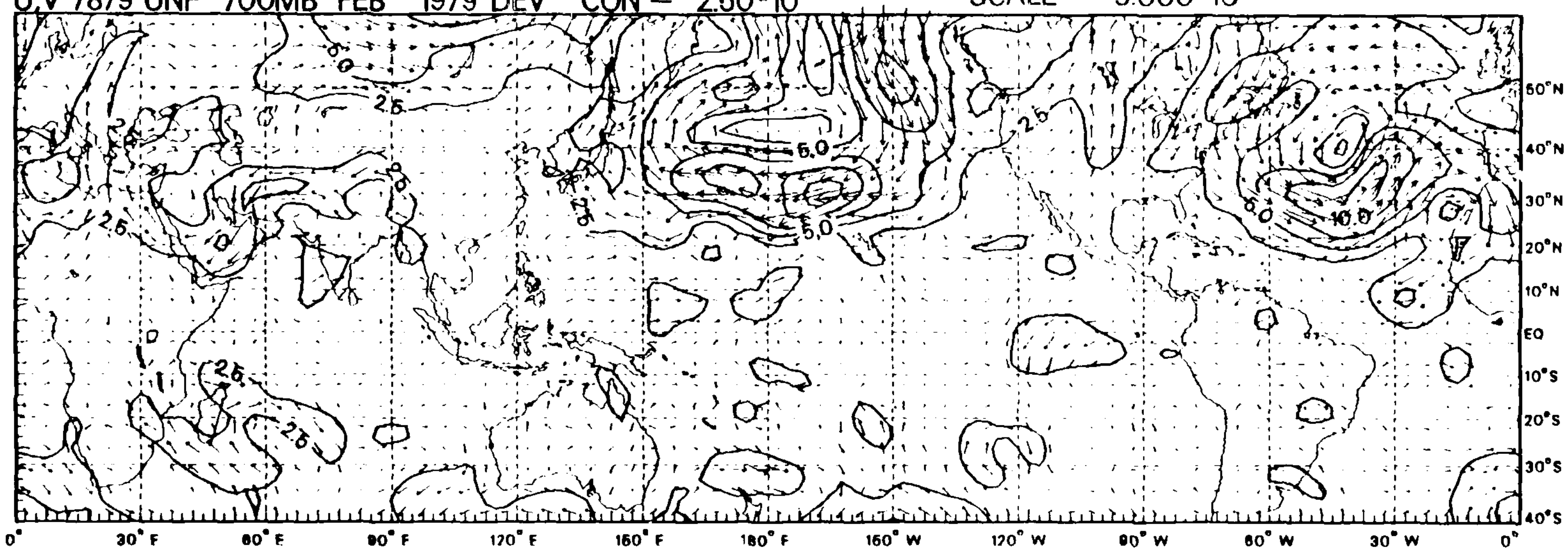

CHI UD,VD 7879 UNF 700MB JAN 1979 DEV CON = $5.00*10^{-1}$ SCALE = $1.000*10^{0}$



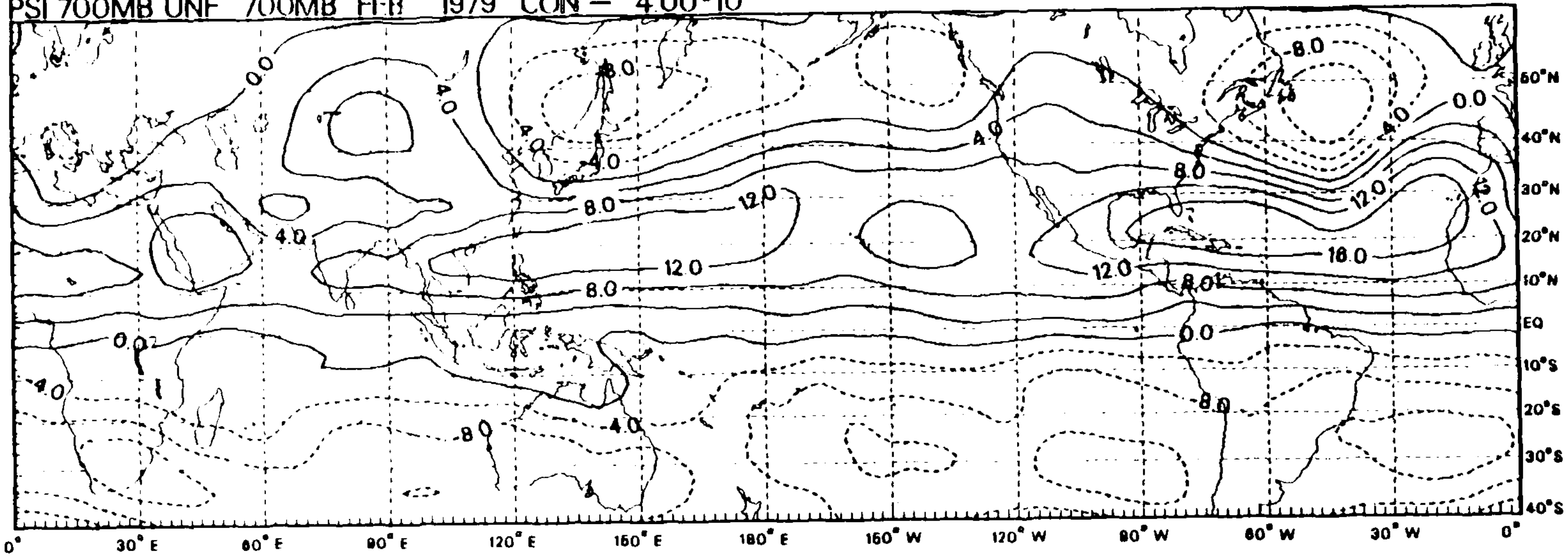
U,V 700MB UNF 700MB FEB 1979 CON = $5.00*10^0$ SCALE = $1.000*10^1$



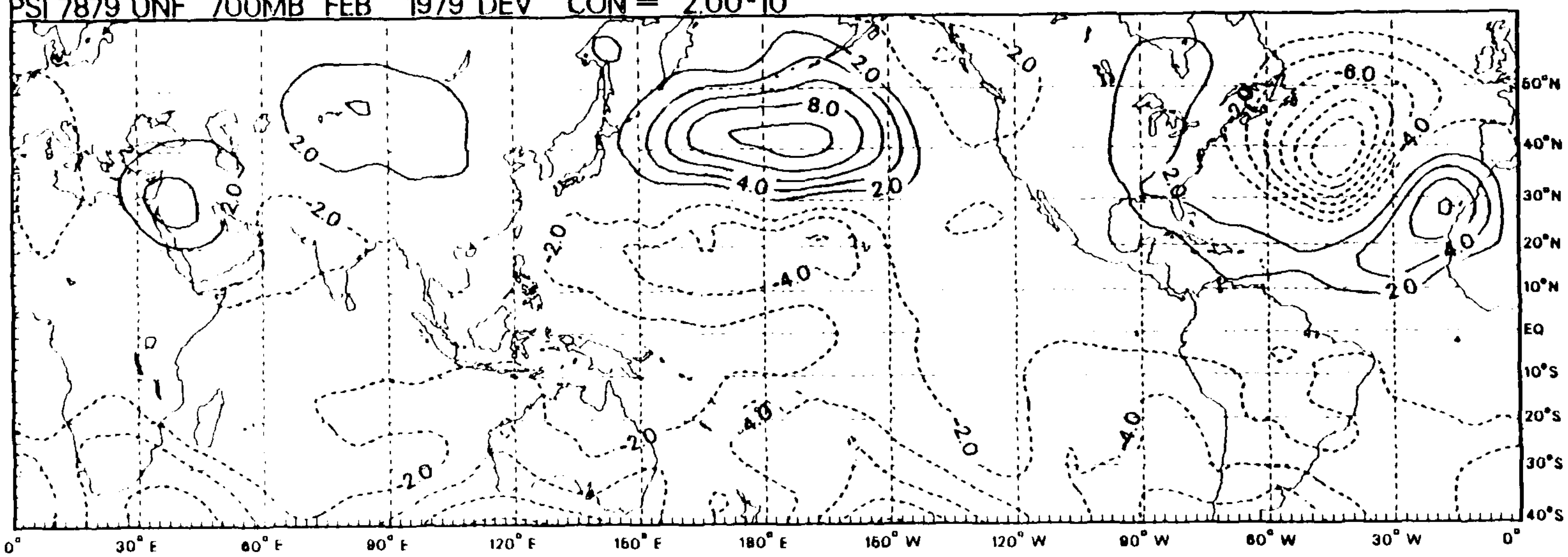

U,V 7879 UNF 700MB FEB 1979 DEV CON = $2.50*10^0$ SCALE = $5.000*10^0$



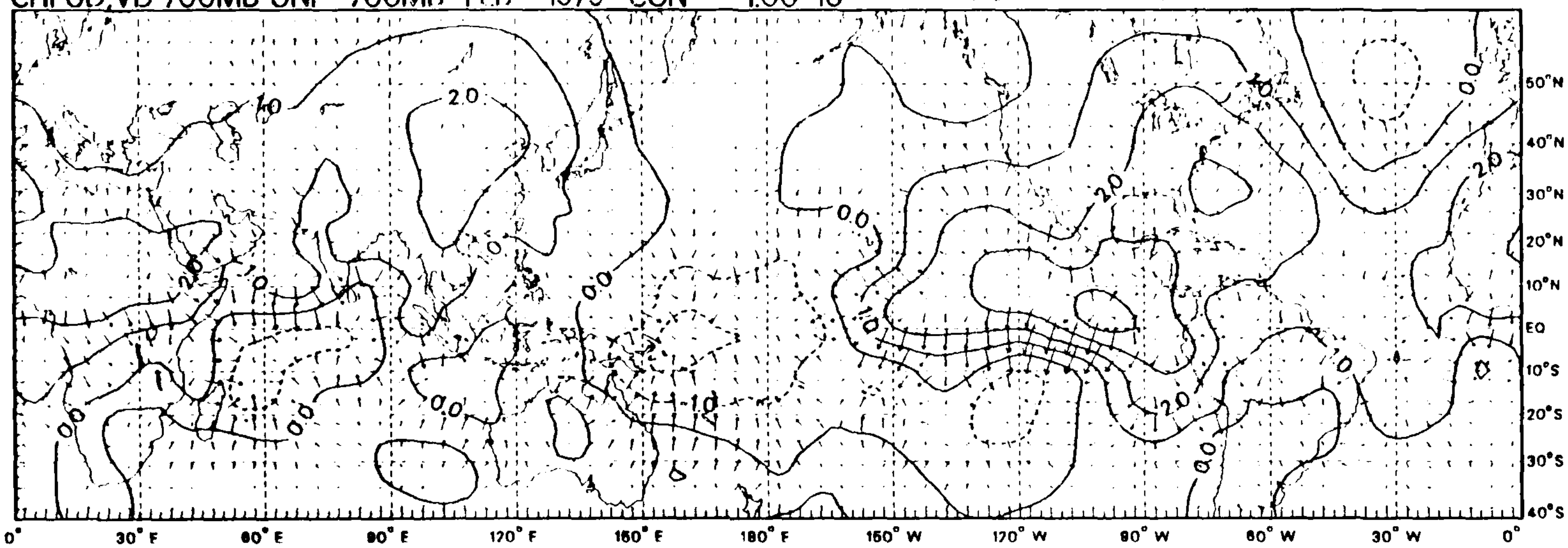
PSI 700MB UNF 700MB FEB 1979 CON = 4.00*10^0



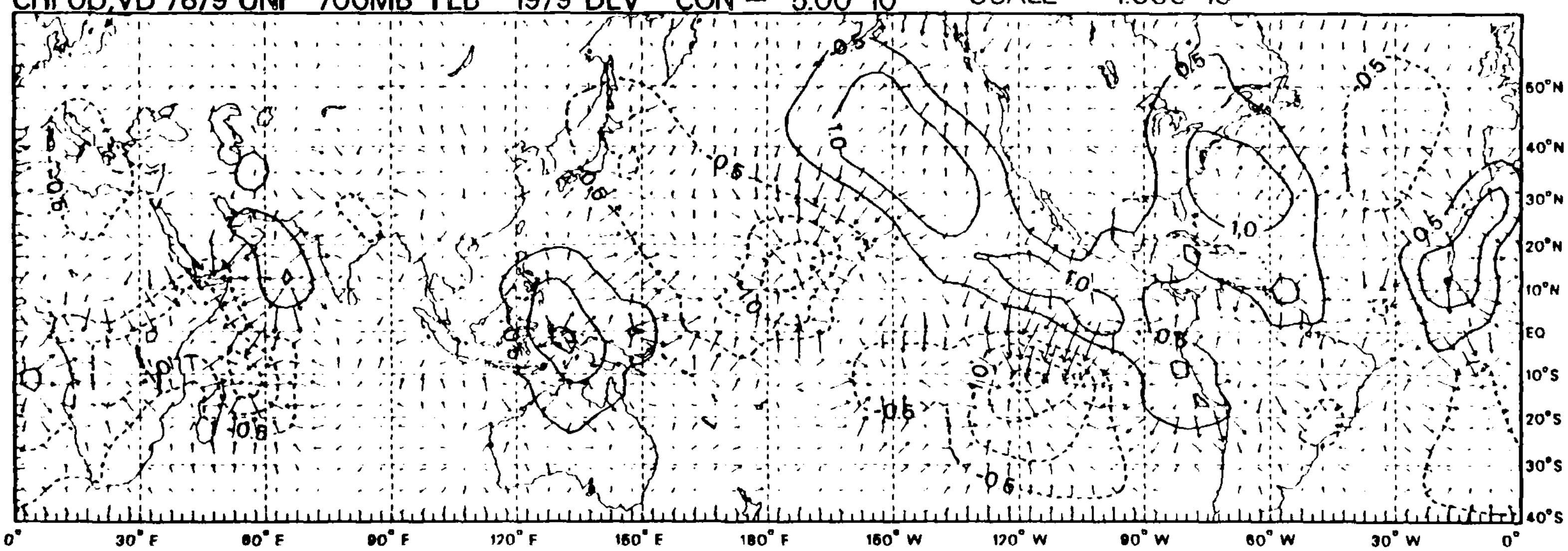

PSI 7879 UNF 700MB FEB 1979 DEV CON = 2.00*10^0



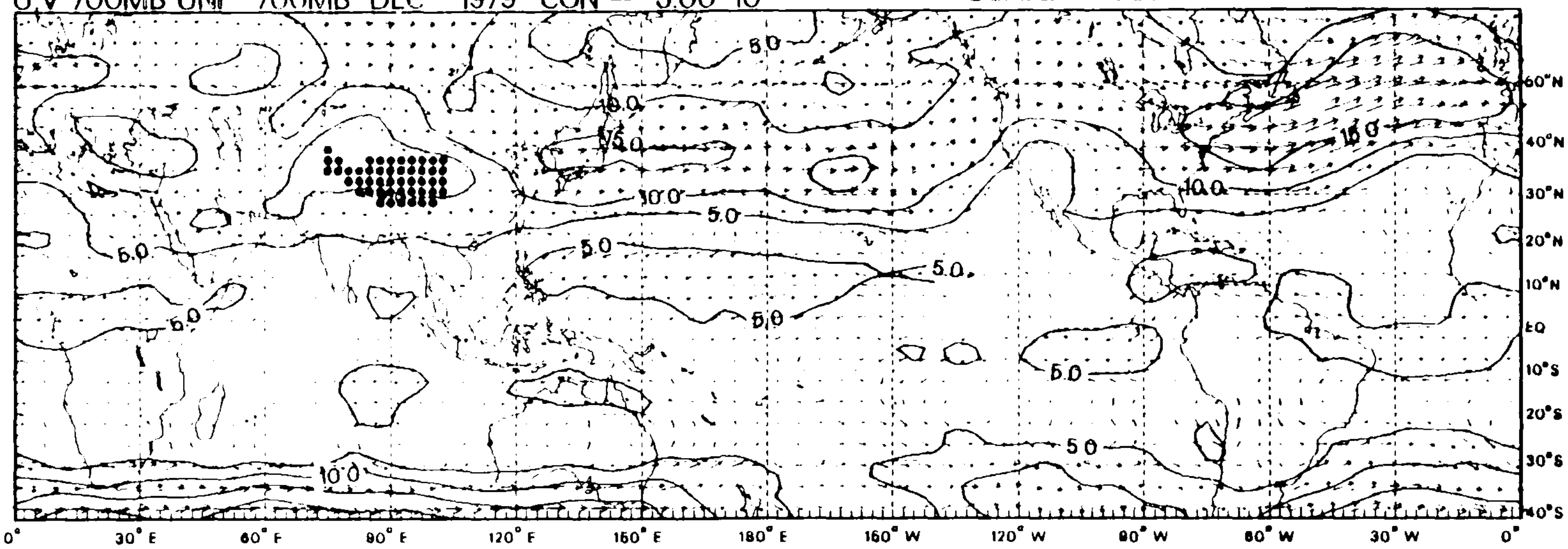
CHI UD,VD 700MB UNF 700MB FEB 1979 CON = $1.00*10^{0}$ SCALE = $2.000*10^{0}$



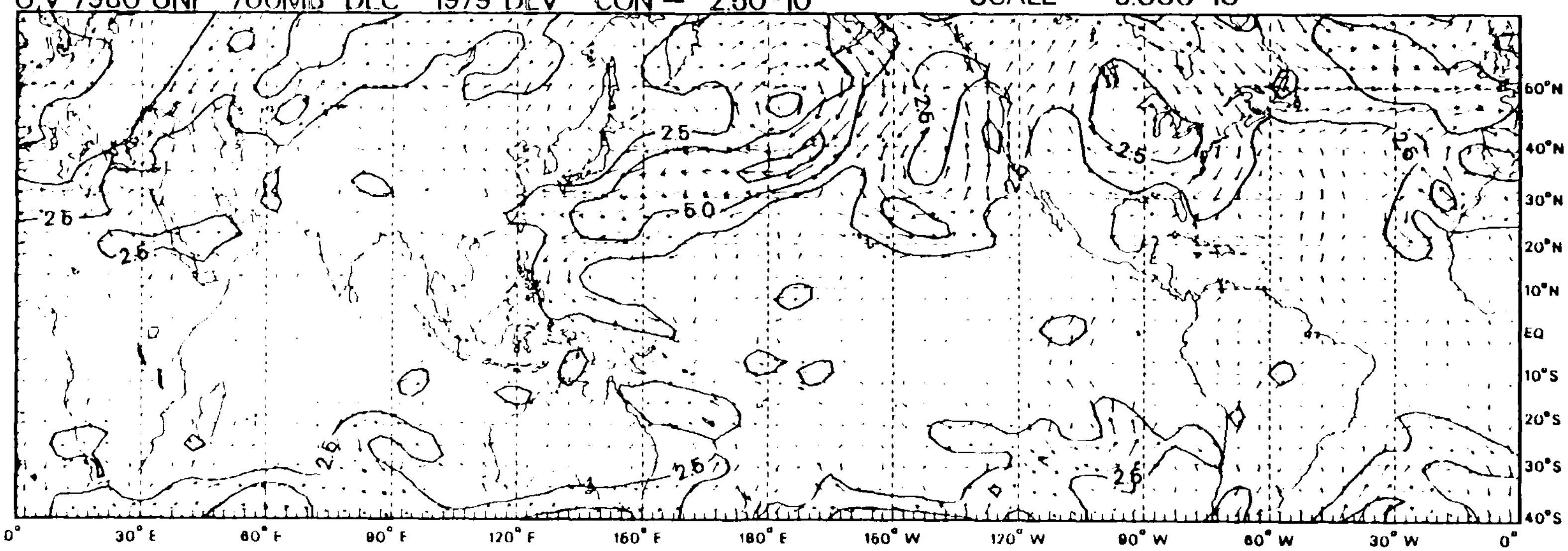

CHI UD,VD 7879 UNF 700MB FEB 1979 DEV CON = $5.00*10^{-1}$ SCALE = $1.000*10^{0}$



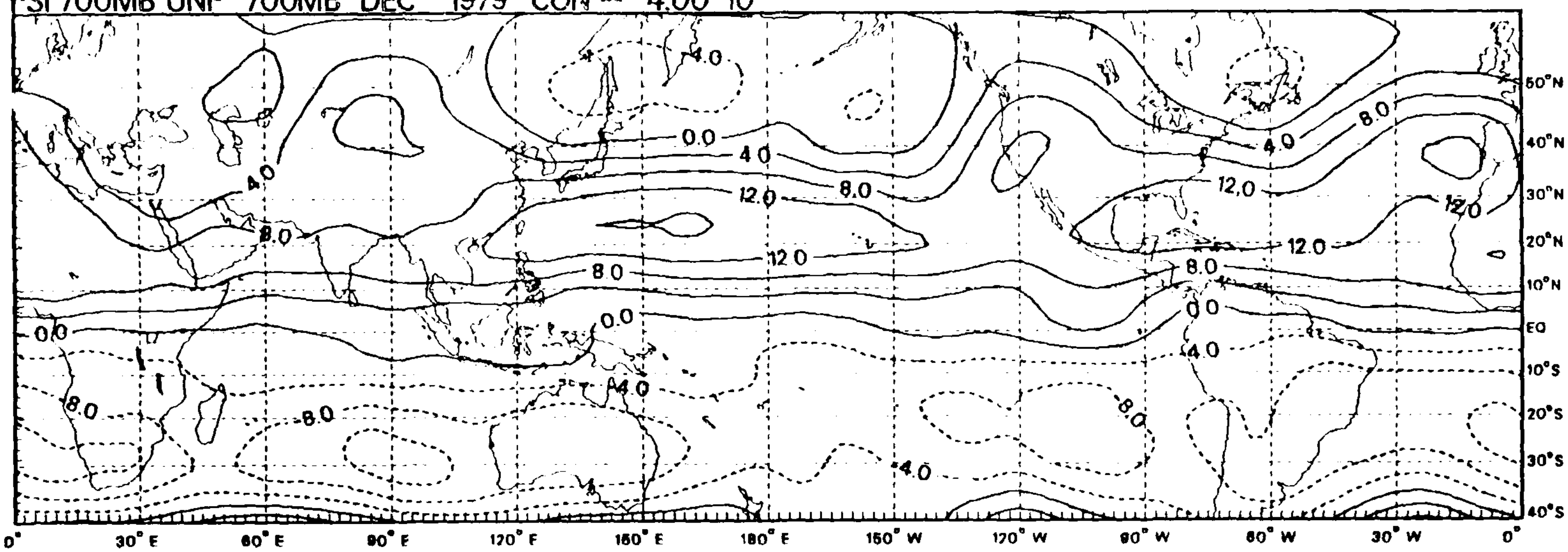
U,V 700MB UNF 700MB DEC 1979 CON = 5.00*10$^0$ SCALE = 1.000*10$^1$



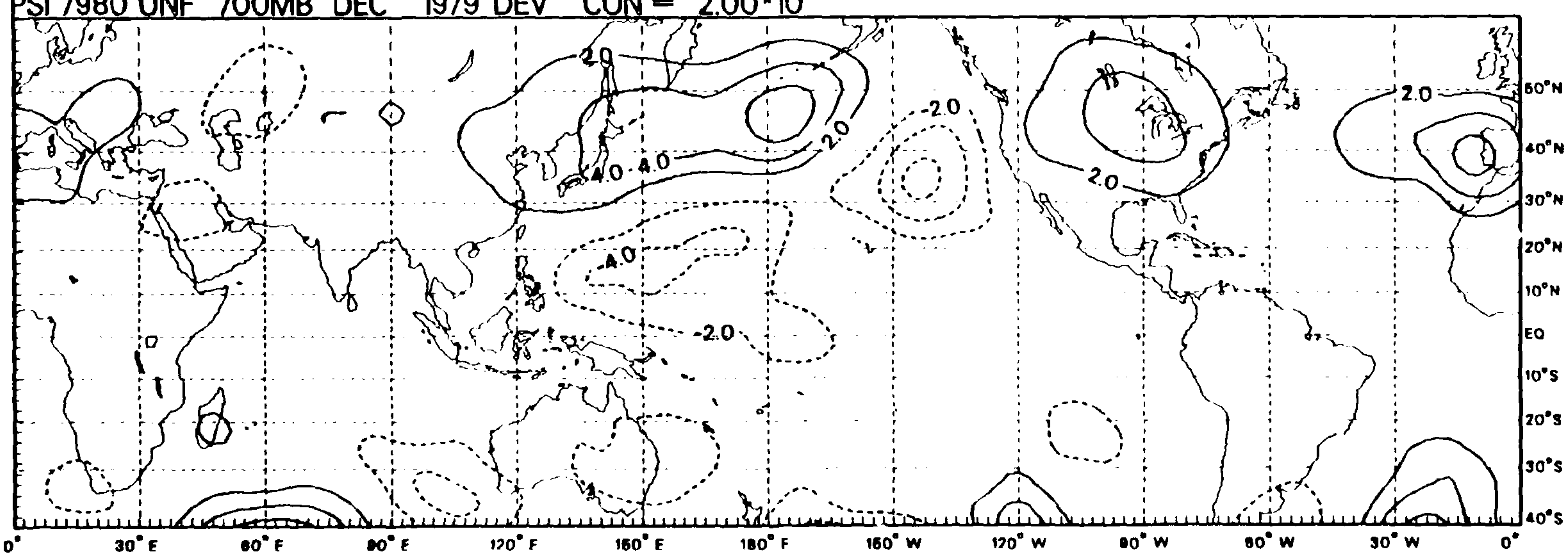

U,V 7980 UNF 700MB DEC 1979 DEV CON = 2.50*10$^0$ SCALE = 5.000*10$^0$



PSI 700MB UNF 700MB DEC 1979 CON = 4.00*10$^0$

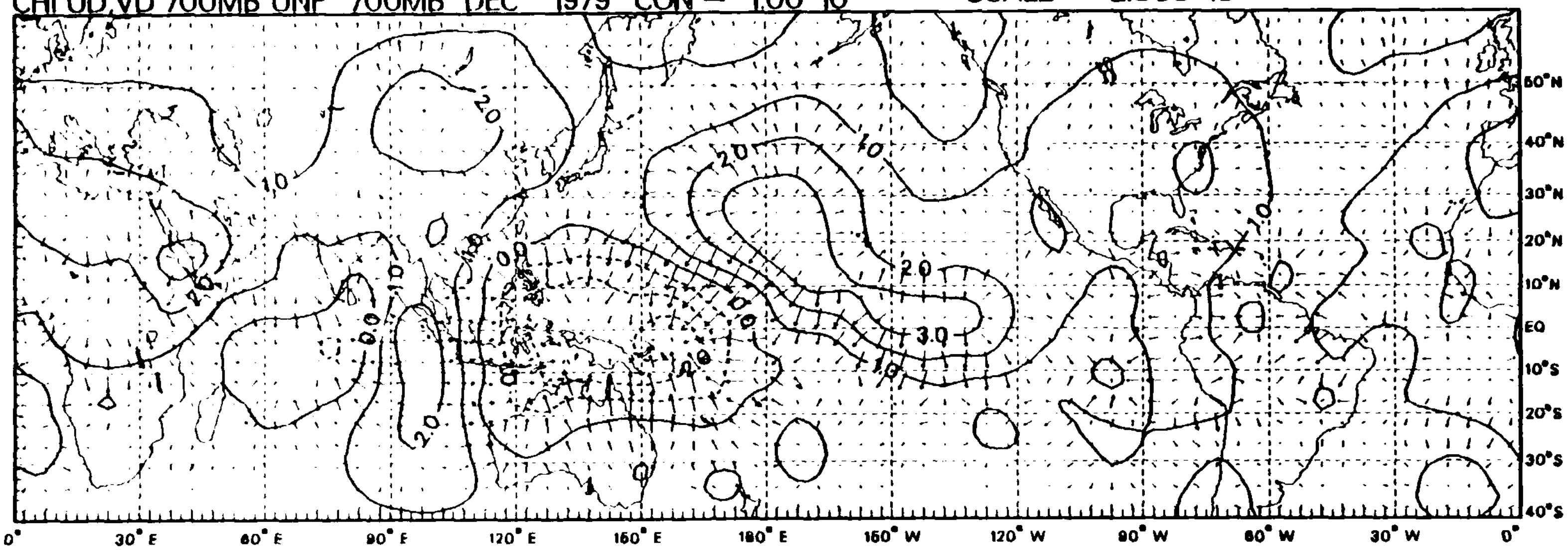


PSI 7980 UNF 700MB DEC 1979 DEV CON = 2.00*10$^0$

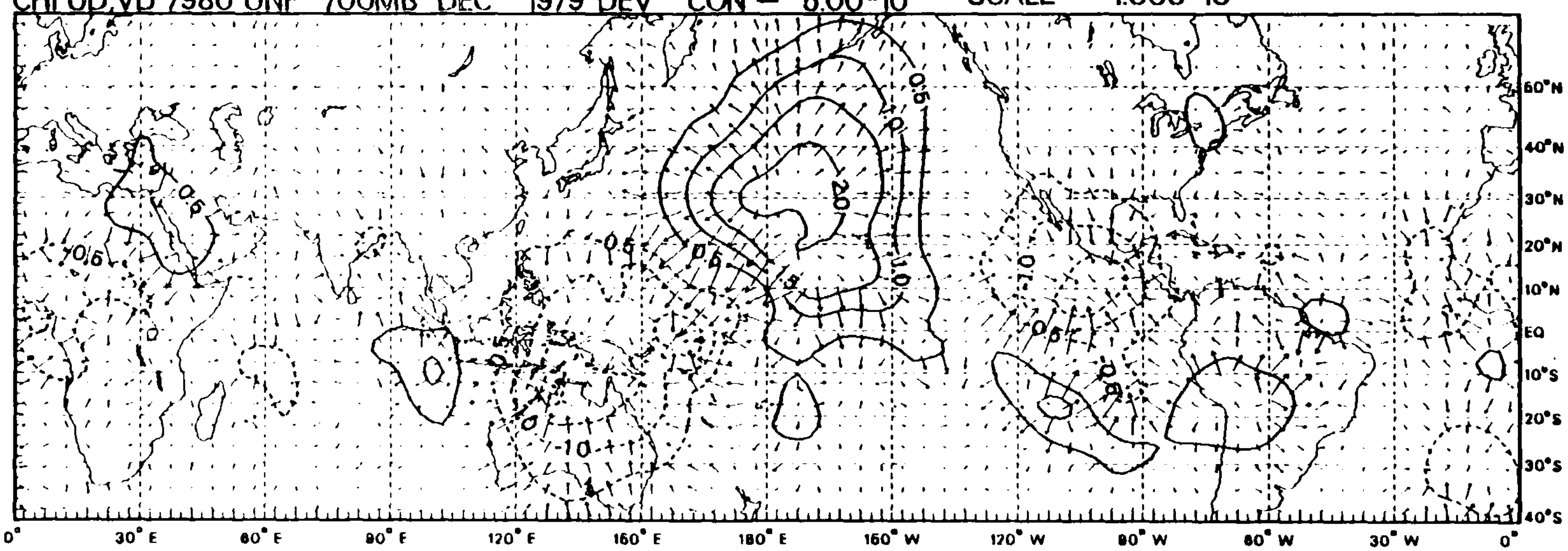


D48

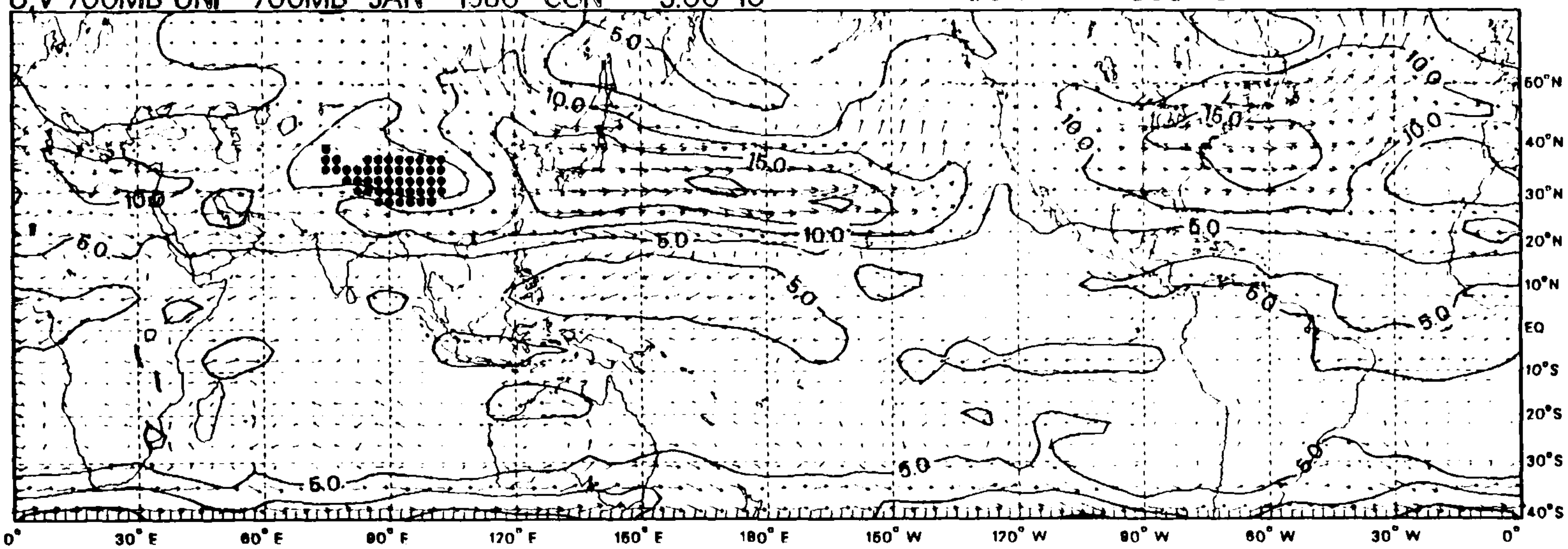
CHI UD,VD 700MB UNF 700MB DEC 1979 CON = 1.00*10^0 SCALE = 2.000*10^0



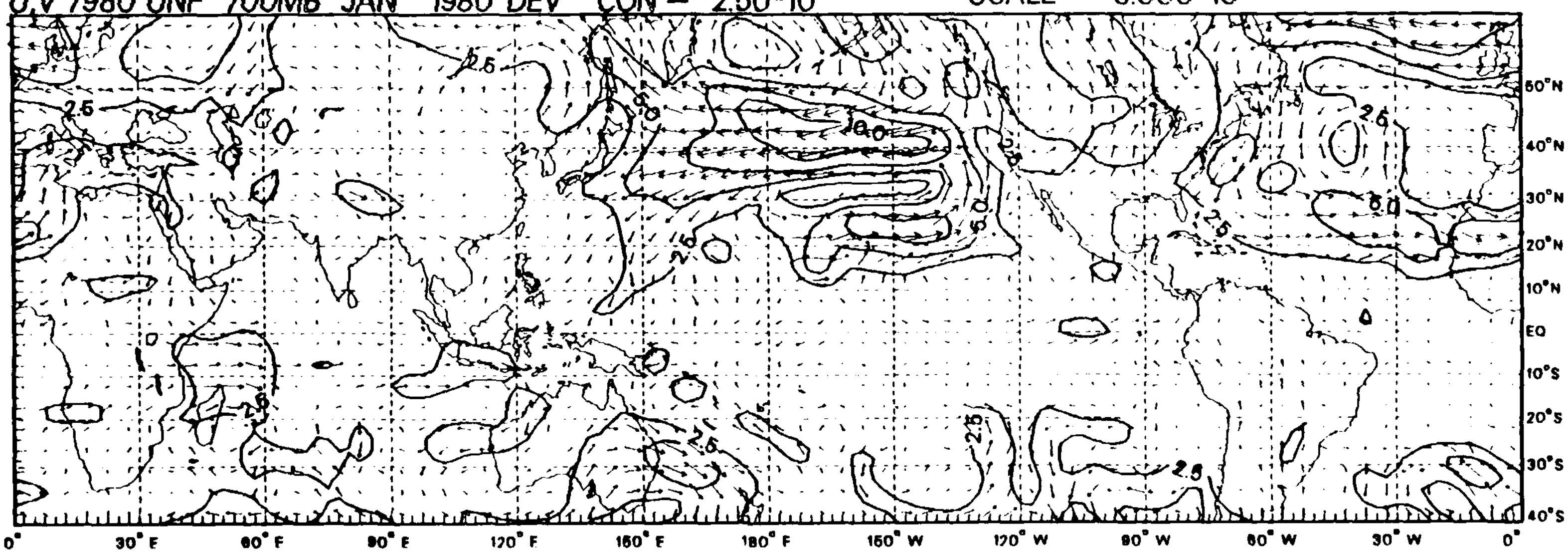

CHI UD,VD 7980 UNF 700MB DEC 1979 DEV CON = 5.00*10^-1 SCALE = 1.000*10^0



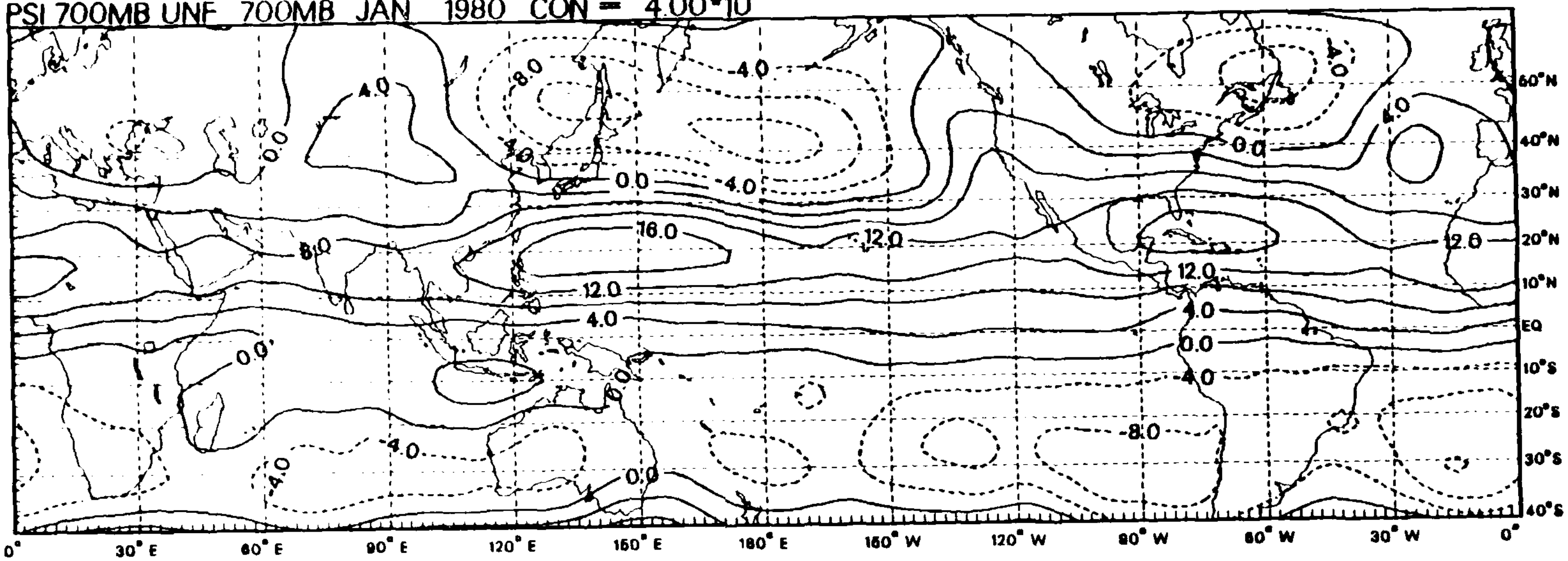
U,V 700MB UNF 700MB JAN 1980 CON = 5.00*10⁰ SCALE = 1.000*10¹



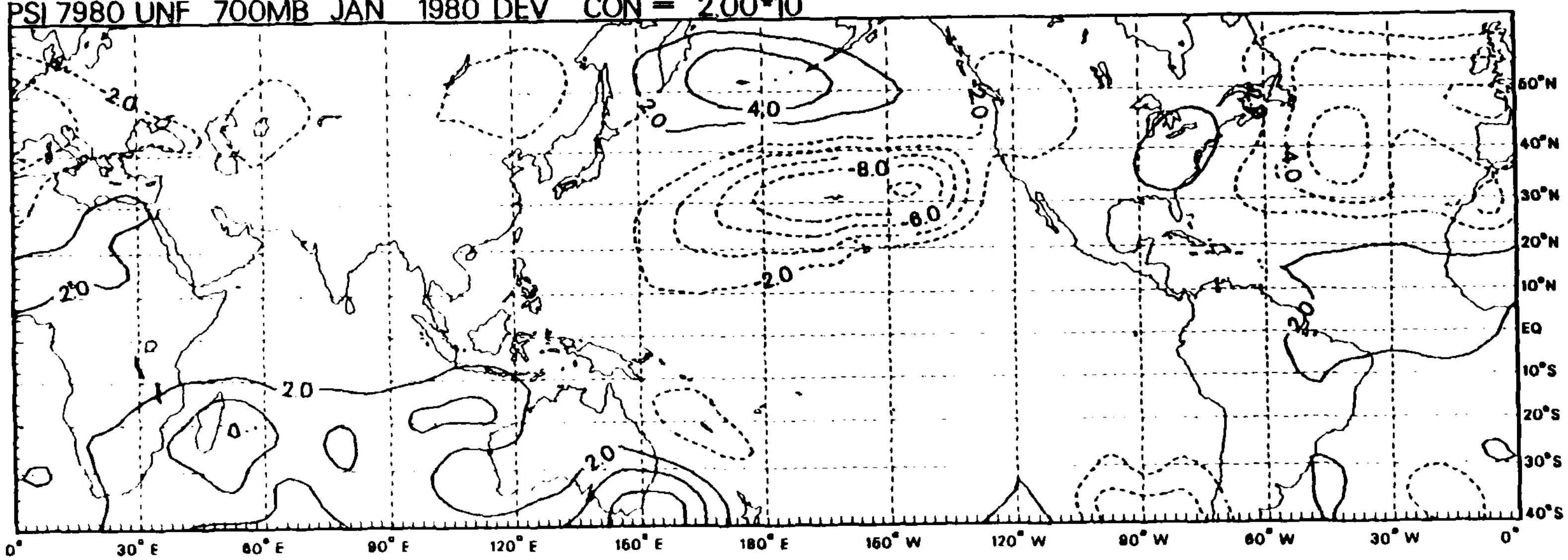

U,V 7980 UNF 700MB JAN 1980 DEV CON = 2.50*10⁰ SCALE = 5.000*10⁰



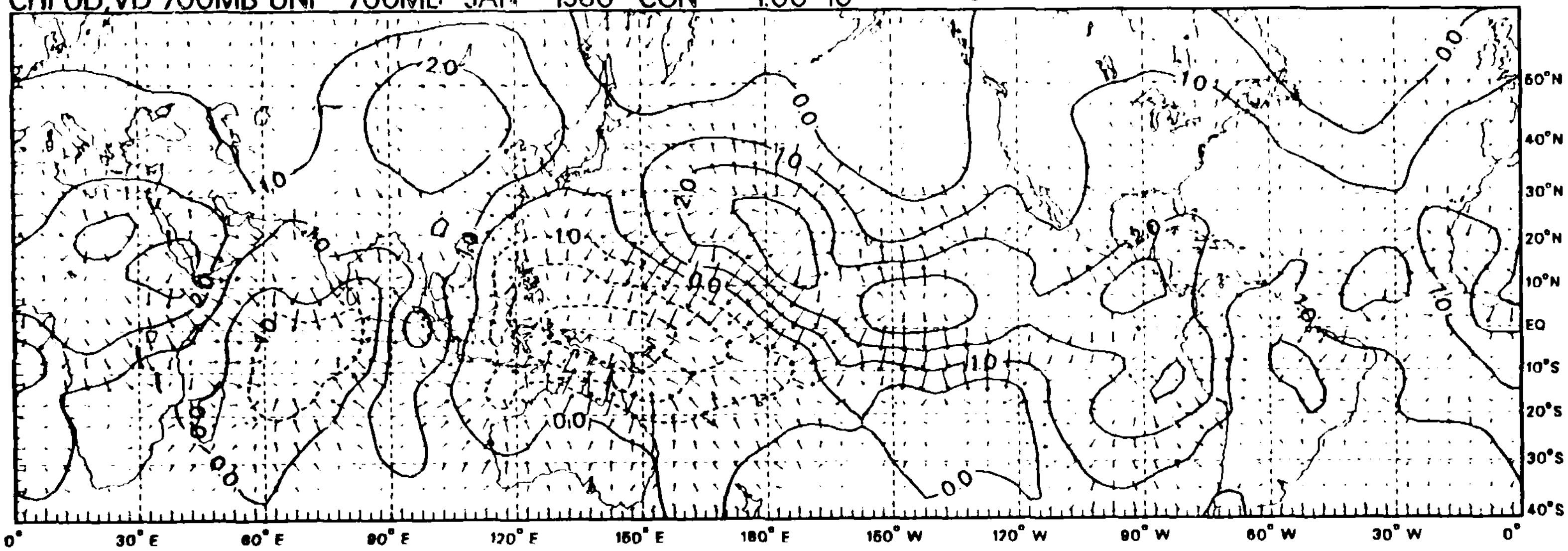
PSI 700MB UNF 700MB JAN 1980 CON = 4.00*10⁰



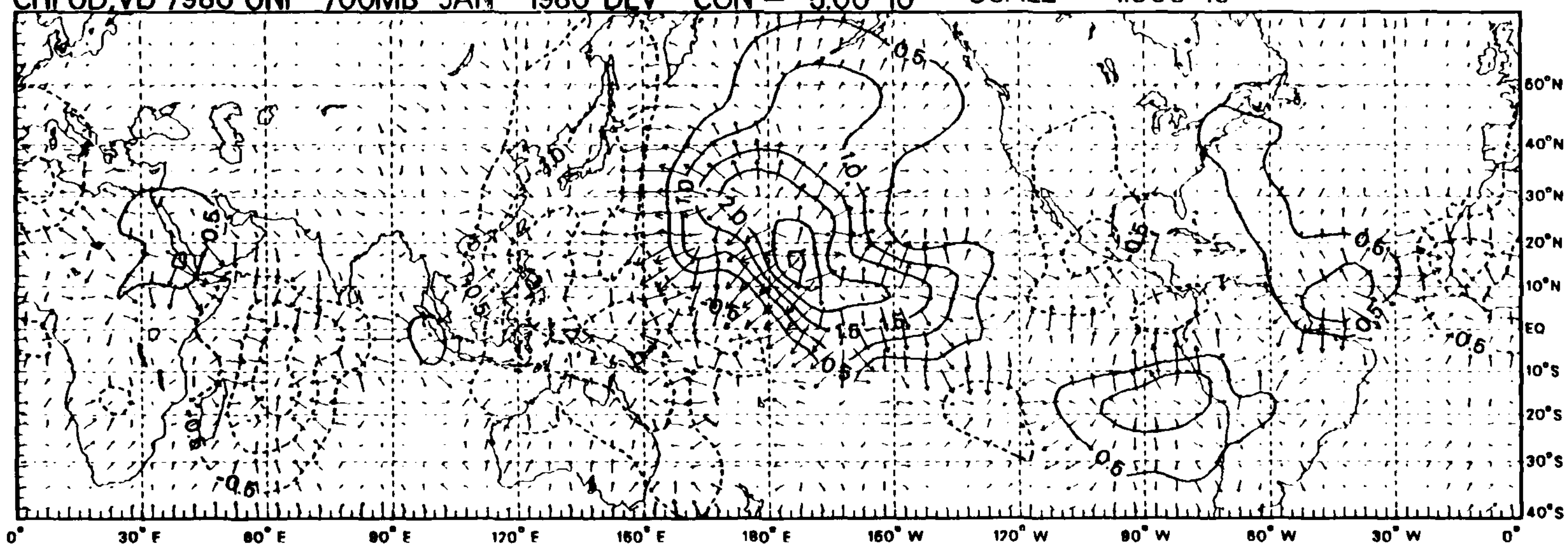

PSI 7980 UNF 700MB JAN 1980 DEV CON = 2.00*10⁰



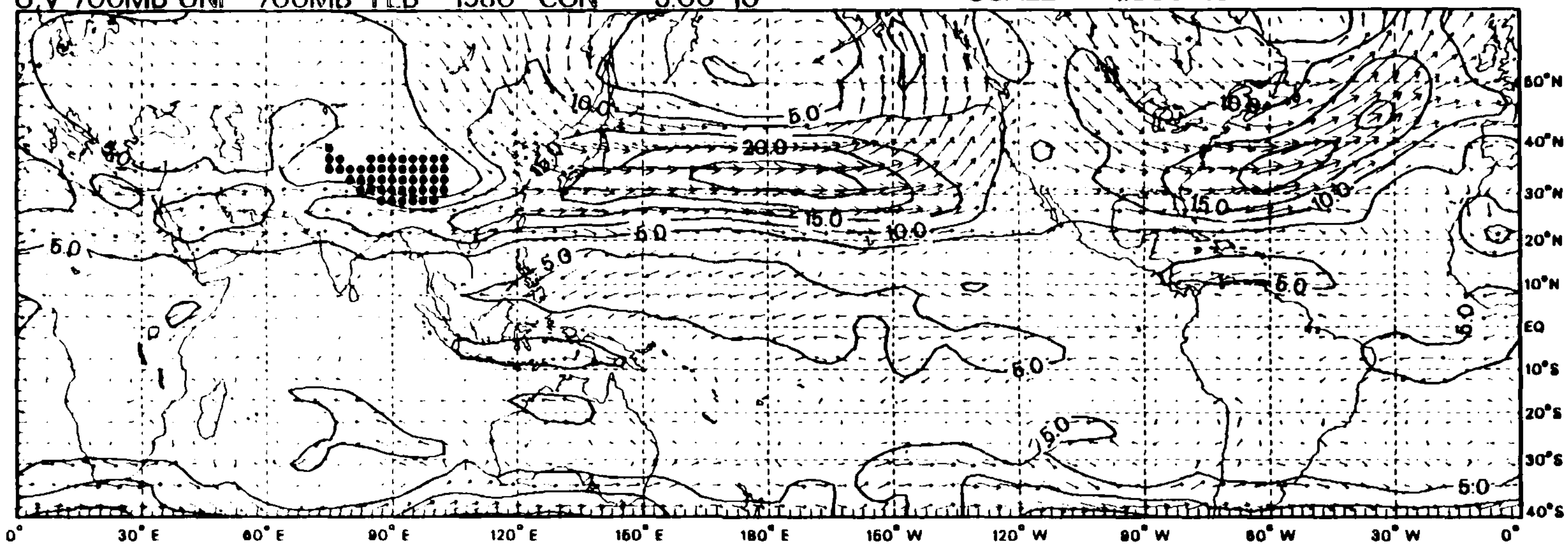
CHI UD,VD 700MB UNF 700MB JAN 1980 CON = $1.00*10^{0}$ SCALE = $2.000*10^{0}$



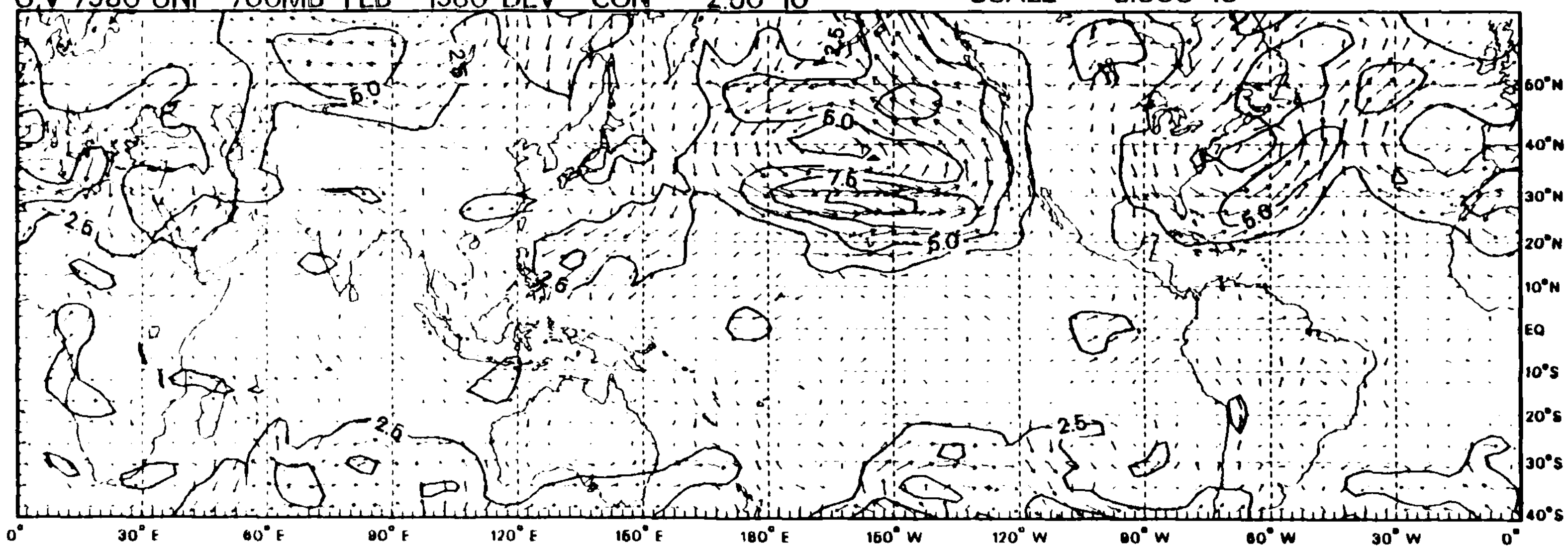

CHI UD,VD 7980 UNF 700MB JAN 1980 DEV CON = $5.00*10^{-1}$ SCALE = $1.000*10^{0}$



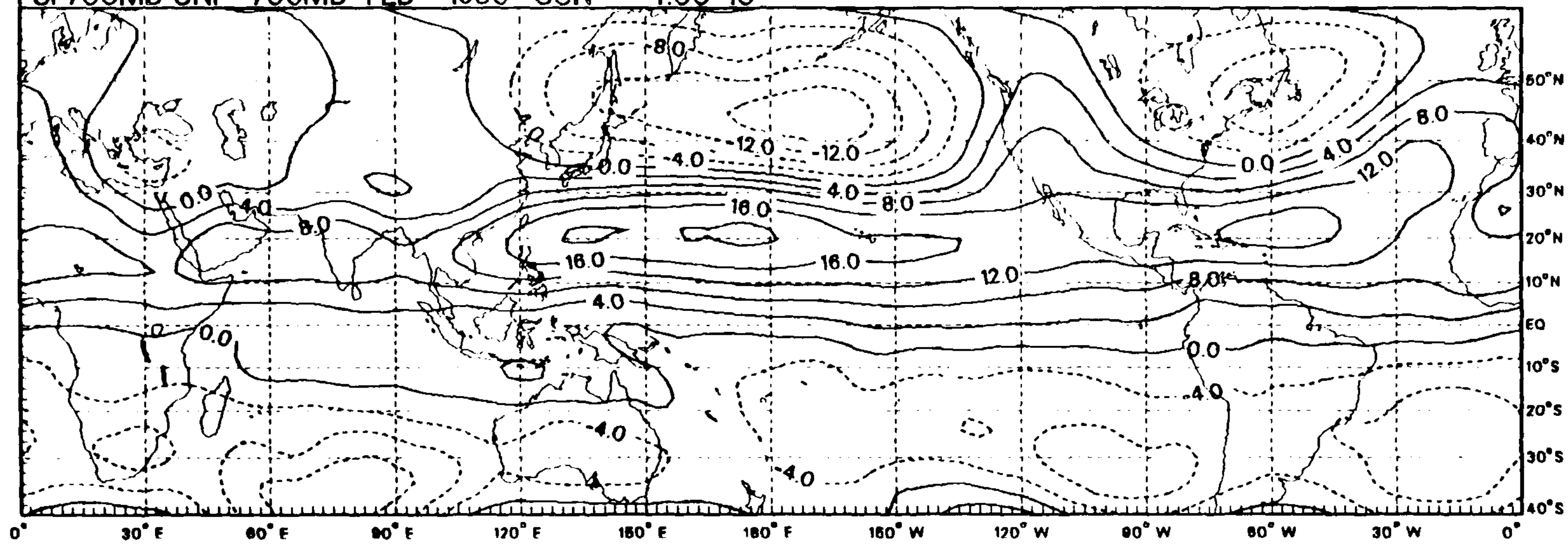
U.V 700MB UNF 700MB FEB 1980 CON = 5.00*10⁰ SCALE = 1.000*10¹



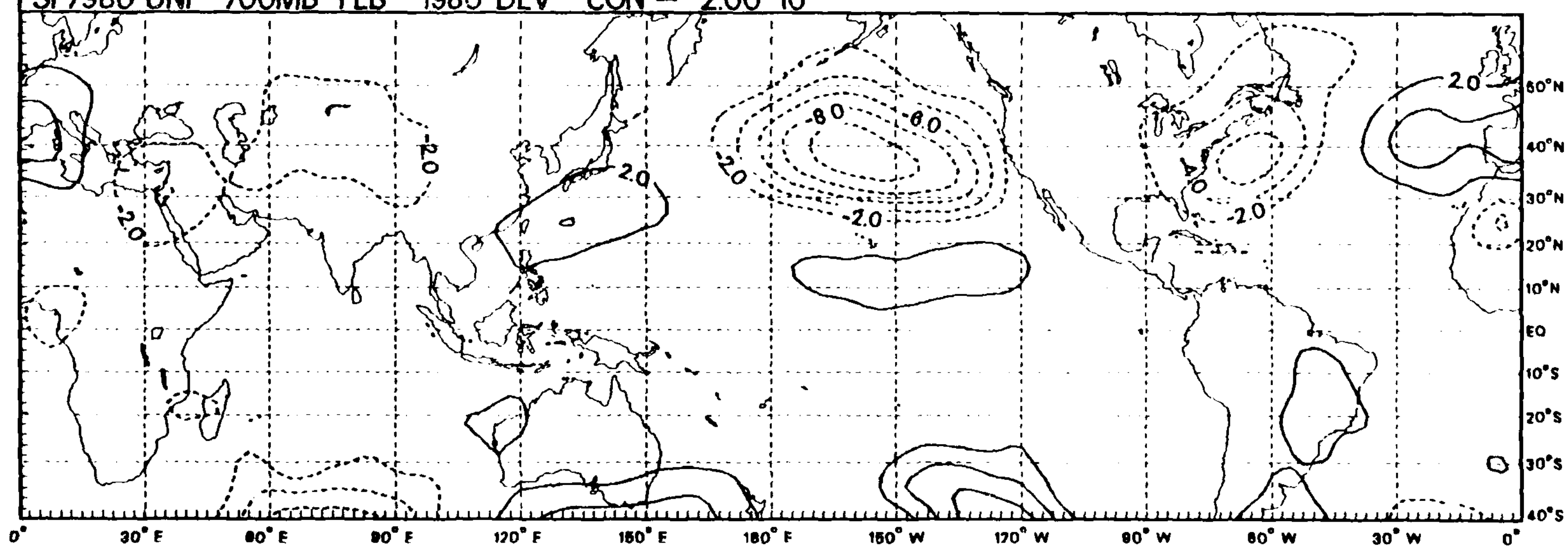

U.V 7980 UNF 700MB FEB 1980 DEV CON = 2.50*10⁰ SCALE = 5.000*10⁰



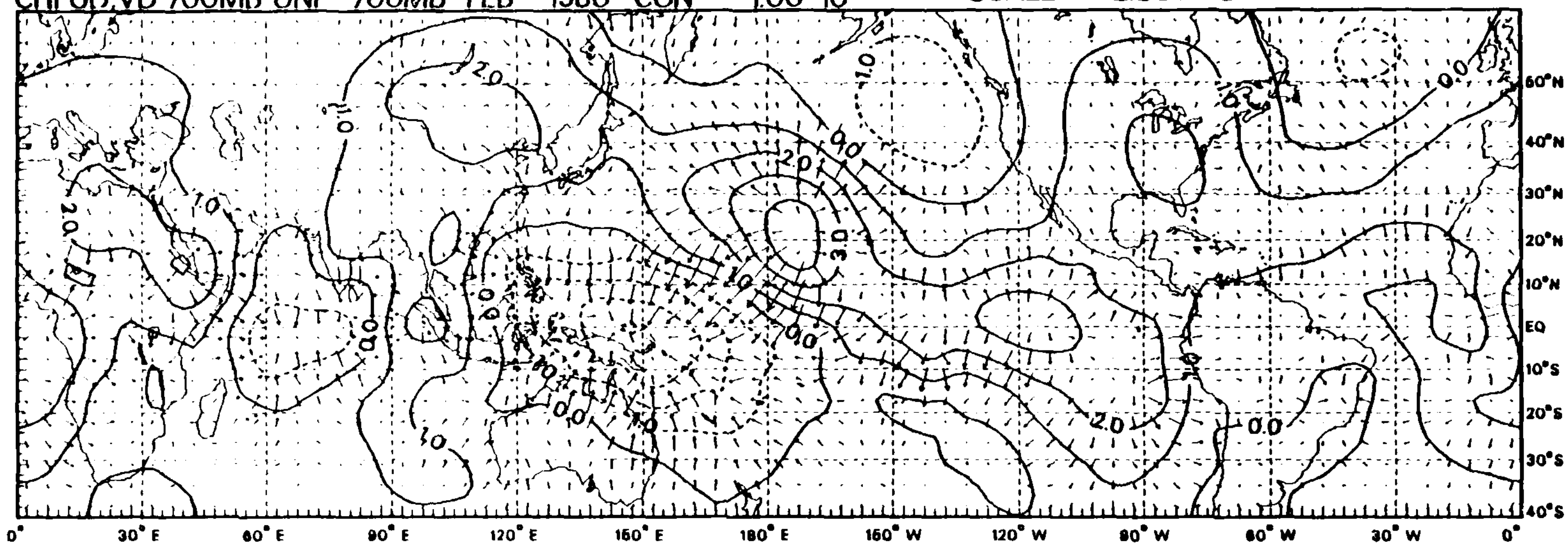
PSI 700MB UNF 700MB FEB 1980 CON = $4.00 * 10^{0}$



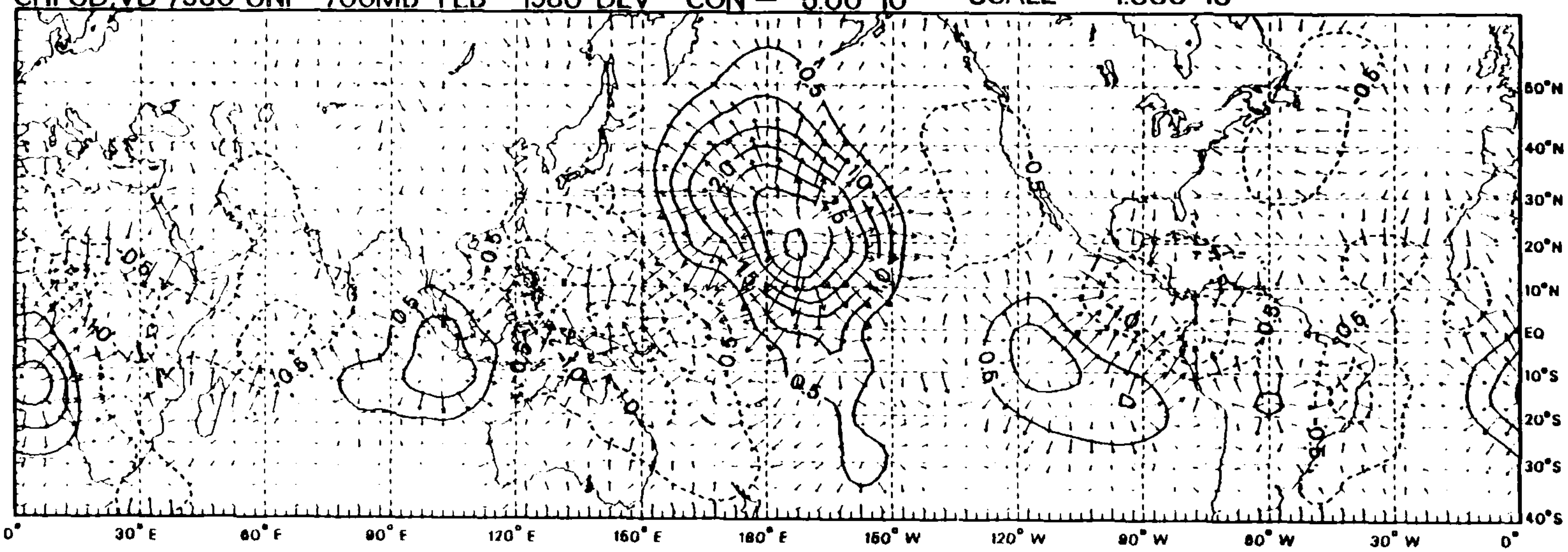

PSI 7980 UNF 700MB FEB 1980 DEV CON = $2.00 * 10^{0}$



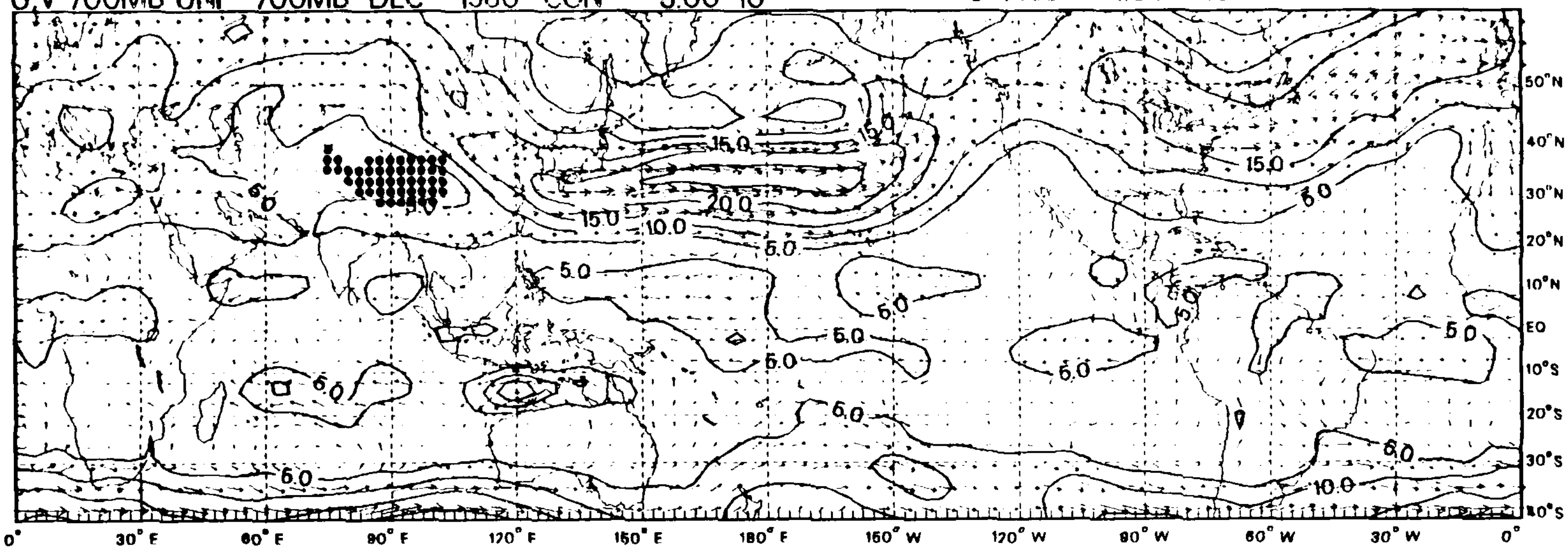
CHI UD,VD 700MB UNF 700MB FEB 1980 CON = $1.00*10^0$ SCALE = $2.000*10^0$



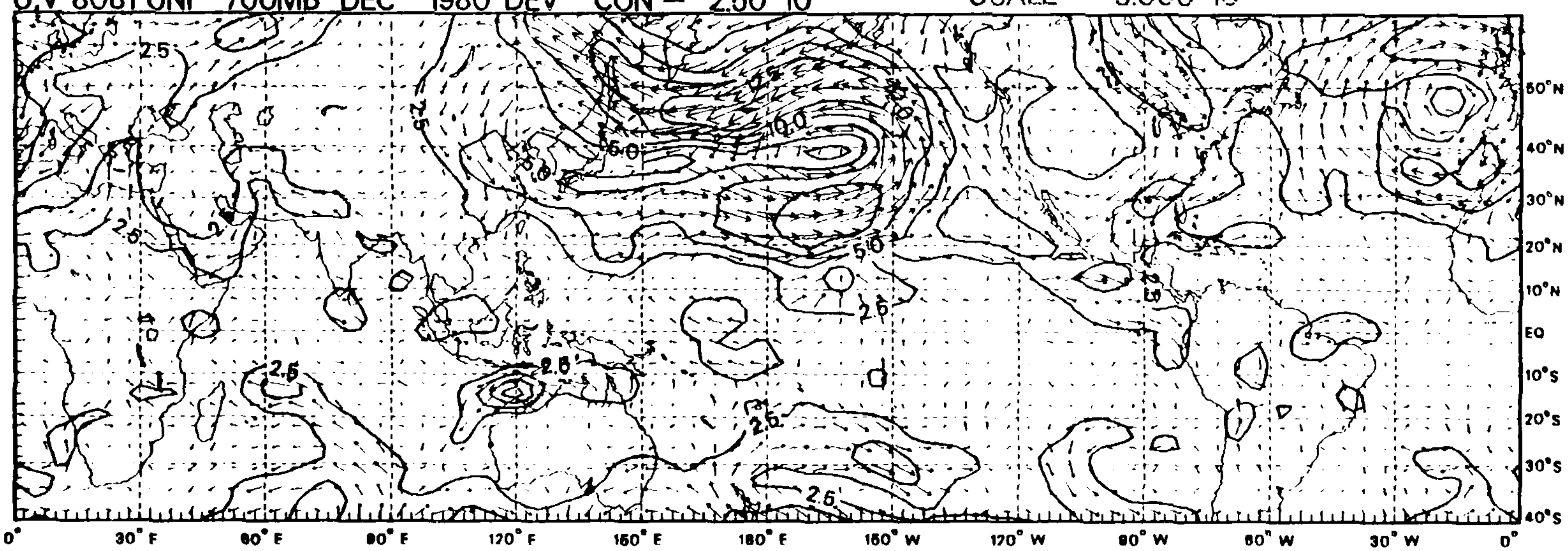
CHI UD,VD 7980 UNF 700MB FEB 1980 DEV CON = $5.00*10^{-1}$ SCALE = $1.000*10^0$



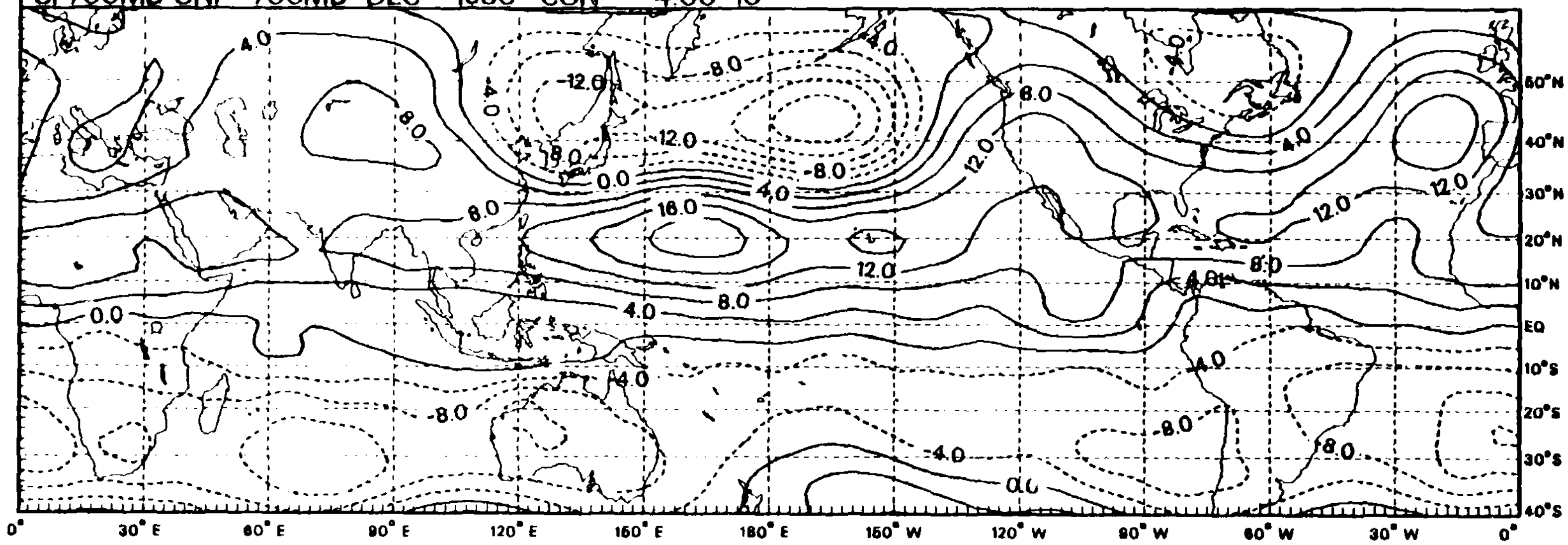
U,V 700MB UNF 700MB DEC 1980 CON = $5.00*10^0$ SCALE = $1.000*10^1$



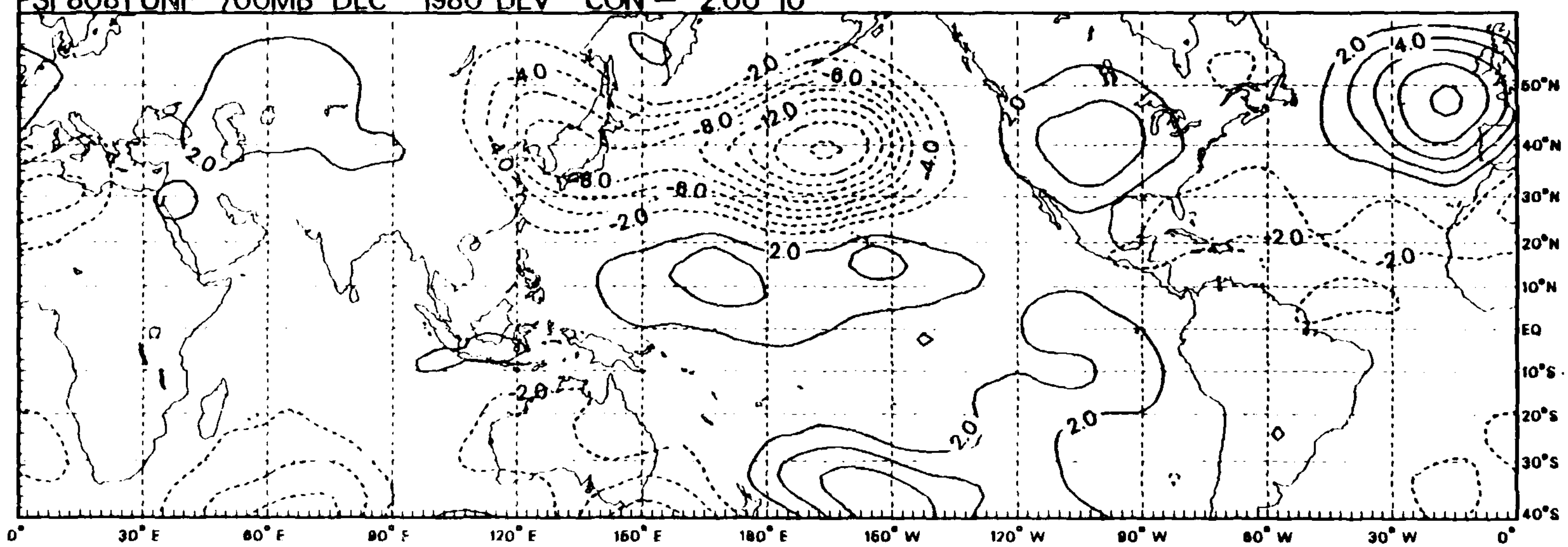

U,V 8081 UNF 700MB DEC 1980 DEV CON = $2.50*10^0$ SCALE = $5.000*10^0$



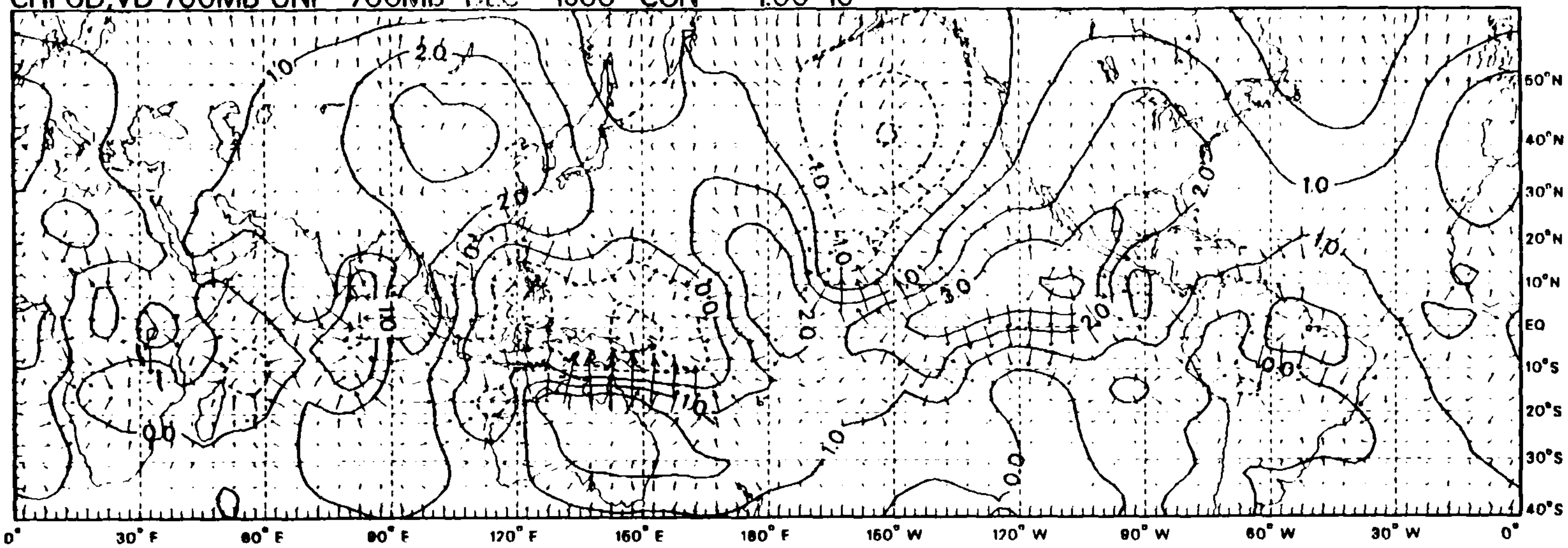
PSI 700MB UNF 700MB DEC 1980 CON = 4.00*10$^{0}$



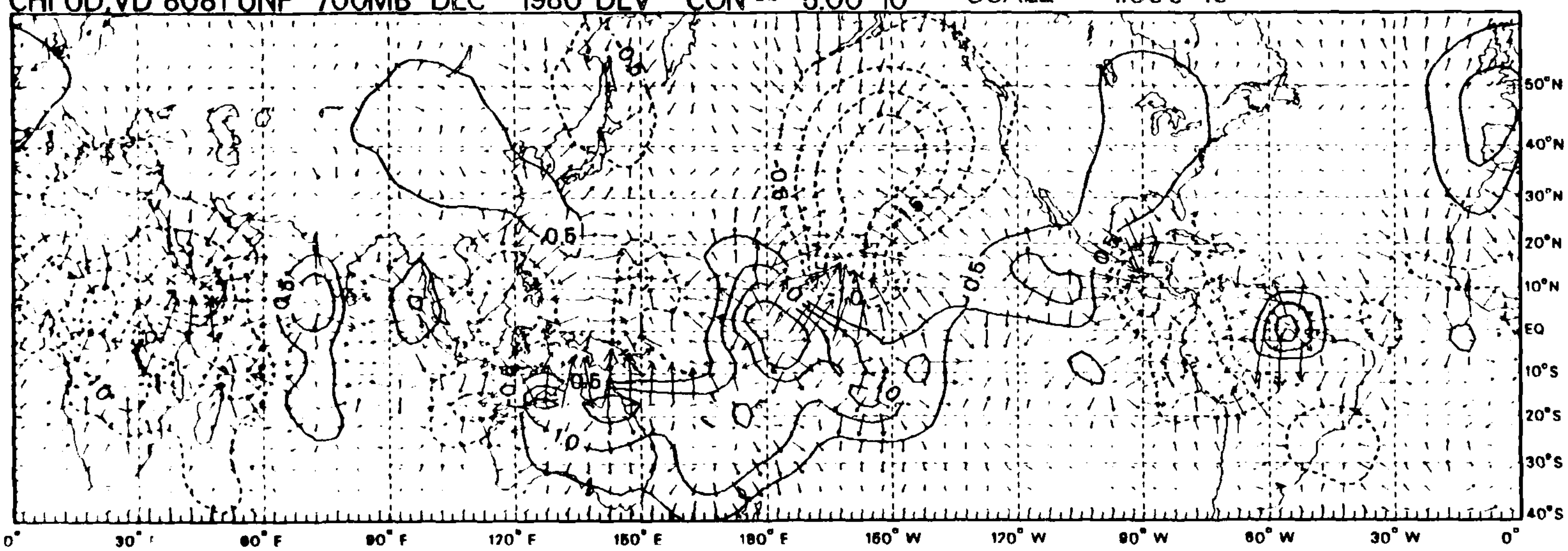
PSI 8081 UNF 700MB DEC 1980 DEV CON = 2.00*10$^{0}$



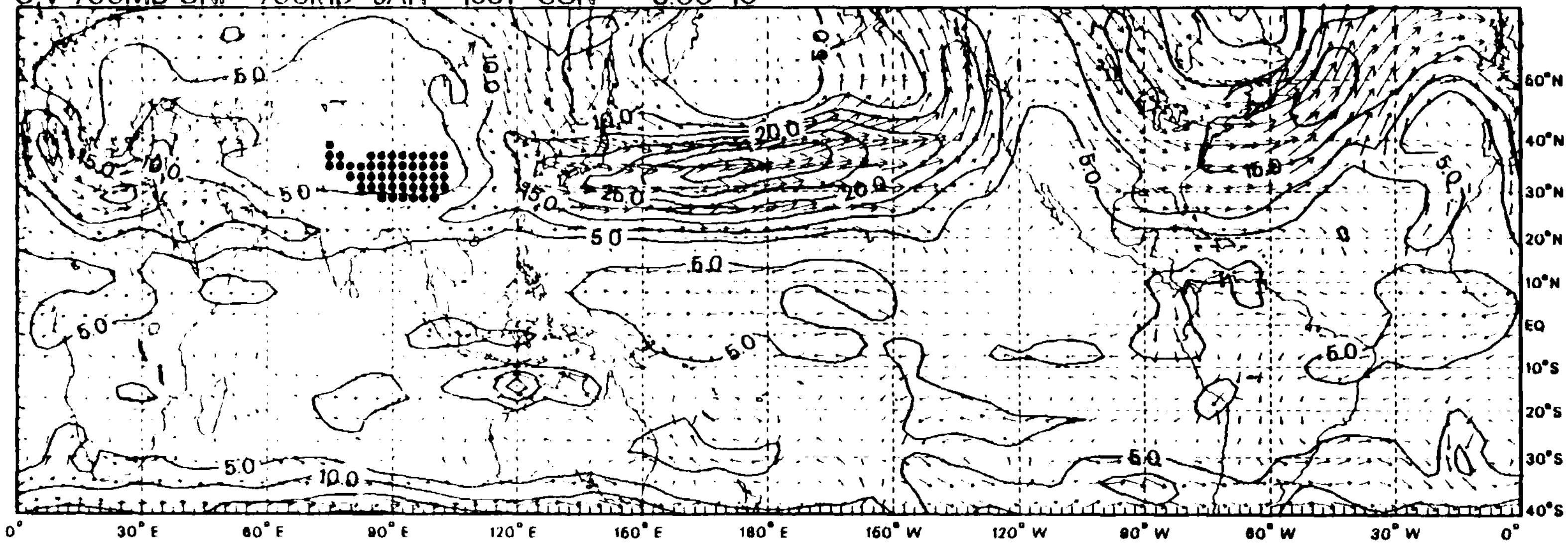
CHI UD,VD 700MB UNF 700MB DEC 1980 CON = 1.00*10$^0$ SCALE = 2.000*10$^0$



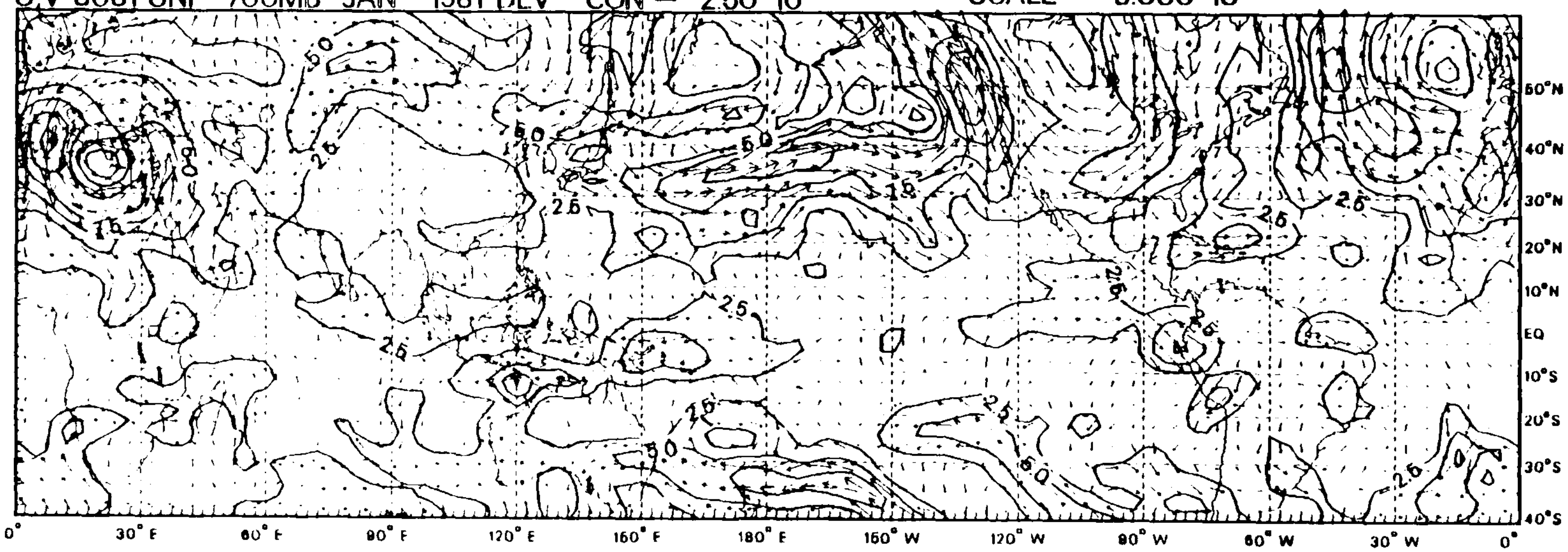

CHI UD,VD 8081 UNF 700MB DEC 1980 DEV CON = 5.00*10$^{-1}$ SCALE = 1.000*10$^0$



U,V 700MB UNF 700MB JAN 1981 CON = 5.00*10^0 SCALE = 1.000*10^1

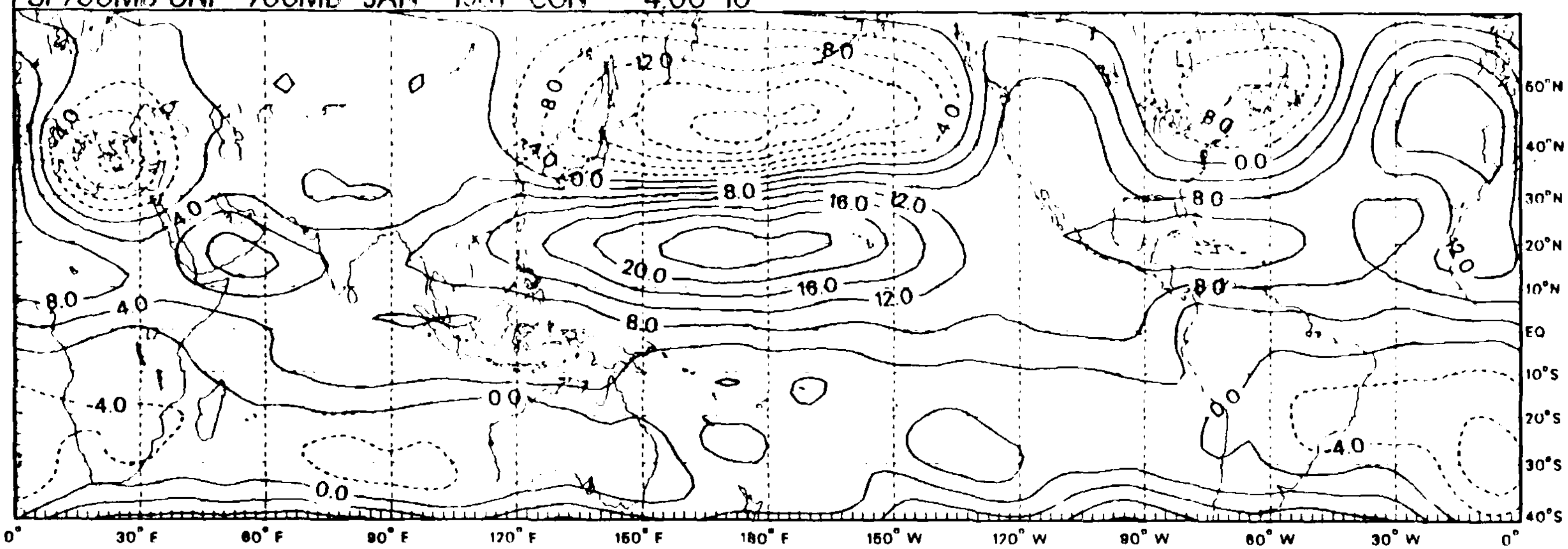



U,V 8081 UNF 700MB JAN 1981 DEV CON = 2.50*10^0 SCALE = 5.000*10^0

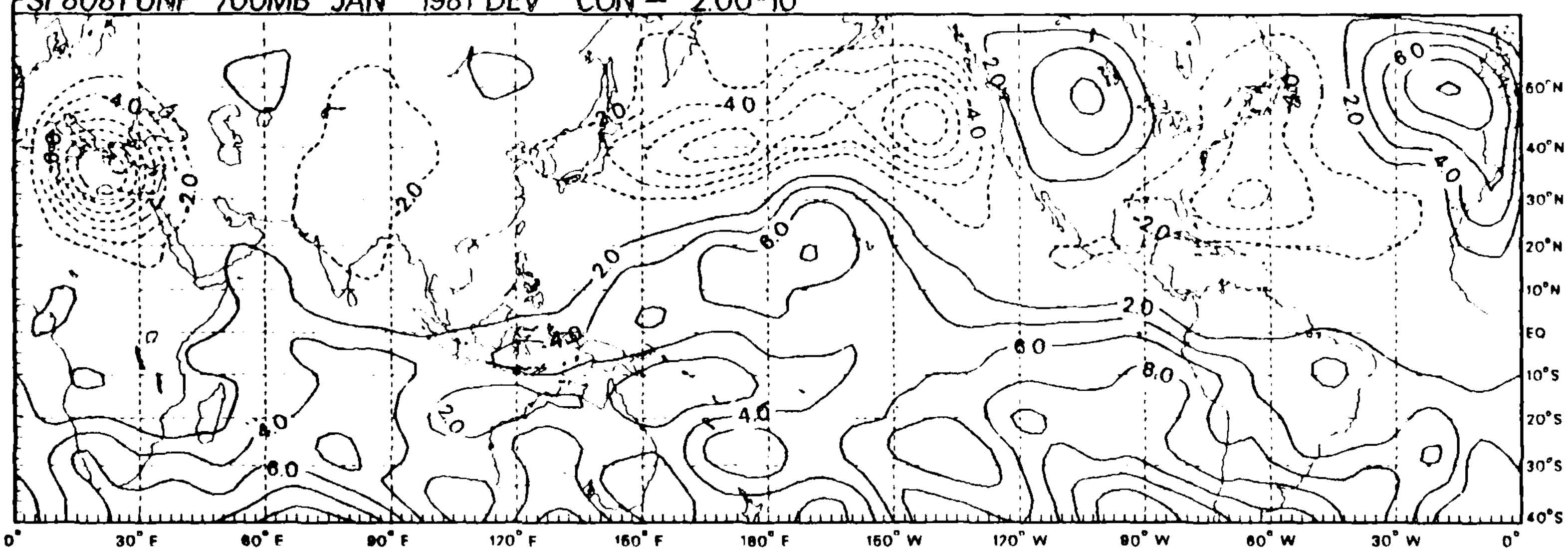


D59

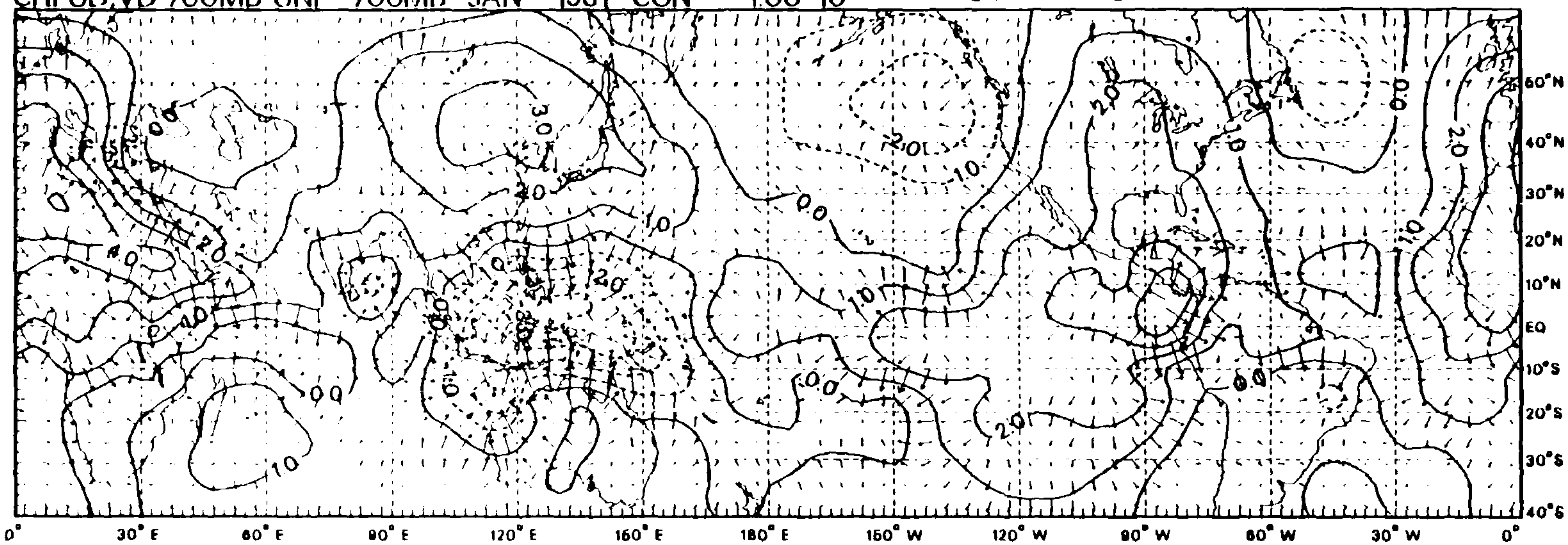
PSI 700MB UNF 700MB JAN 1981 CON = 4.00*10^0



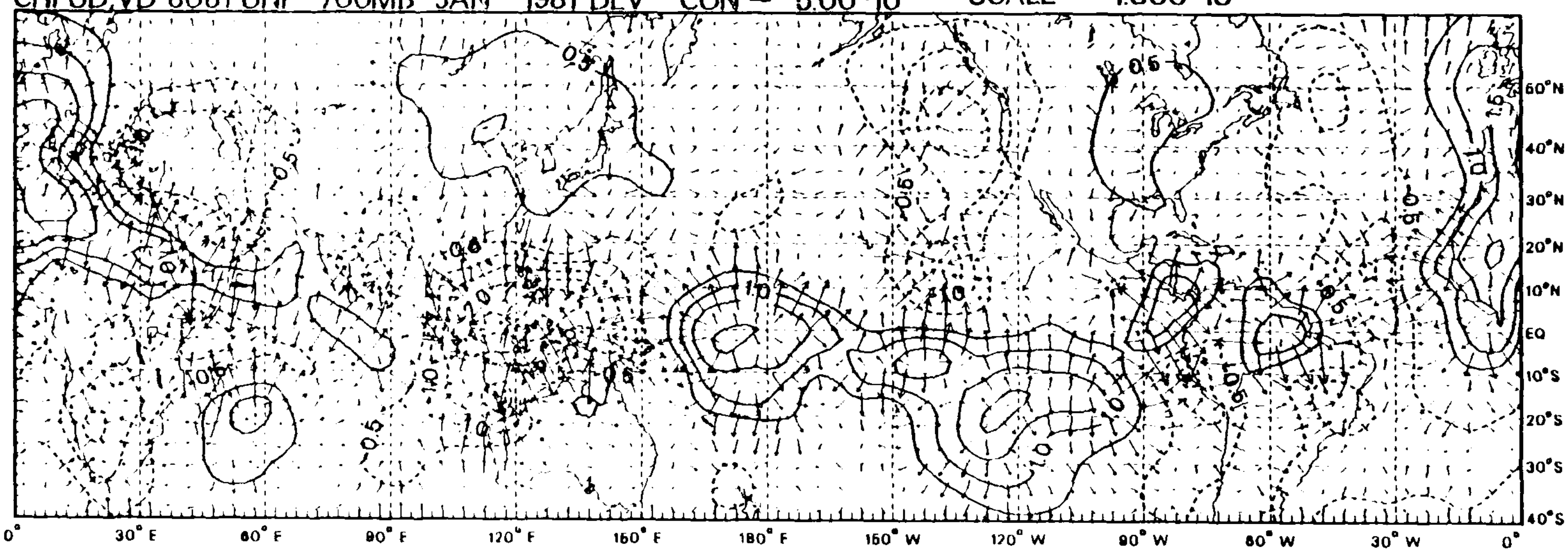

PSI 8081 UNF 700MB JAN 1981 DEV CON = 2.00*10^0



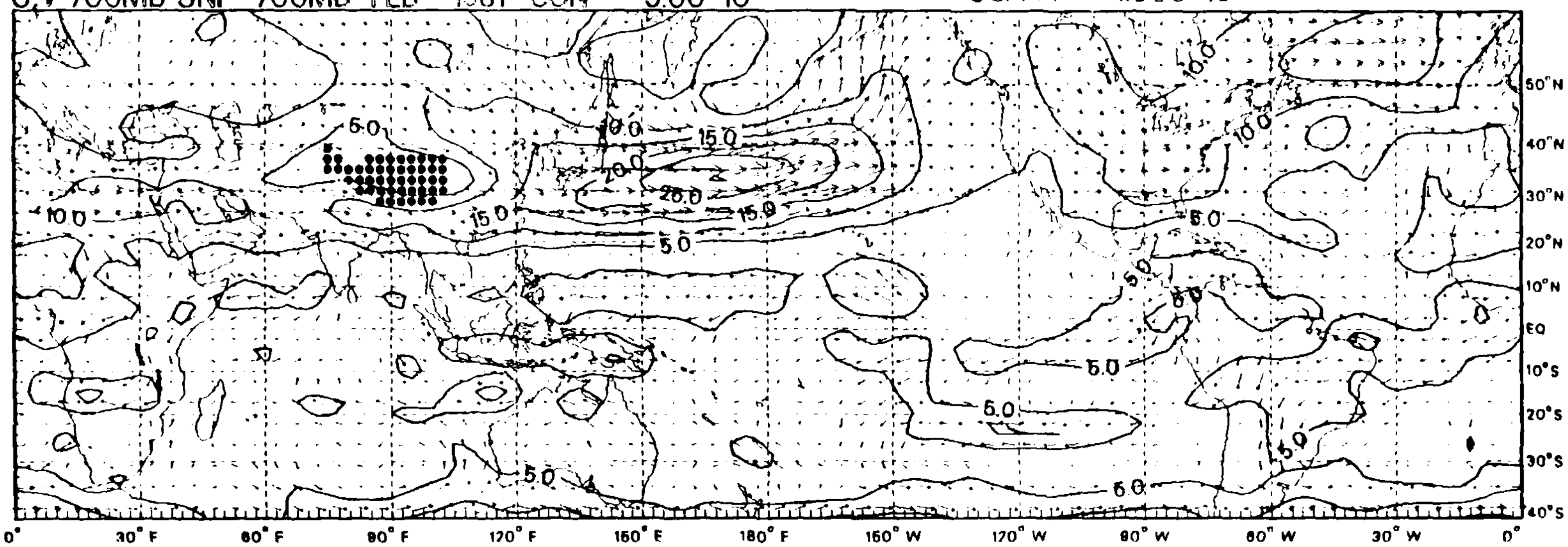
CHI UD,VD 700MB UNF 700MB JAN 1981 CON = 1.00*10$^{0}$ SCALE = 2.000*10$^{0}$



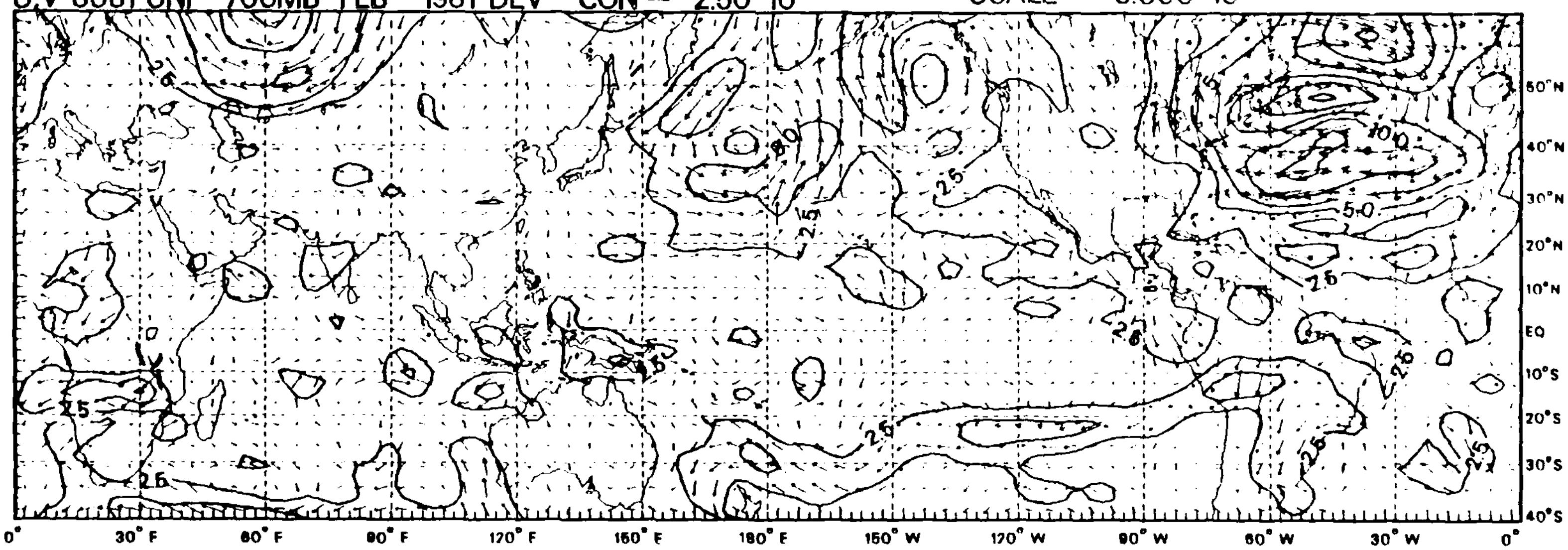

CHI UD,VD 8081 UNF 700MB JAN 1981 DEV CON = 5.00*10$^{-1}$ SCALE = 1.000*10$^{0}$



U,V 700MB UNF 700MB FEB 1981 CON = $5.00*10^0$ SCALE = $1.000*10^1$

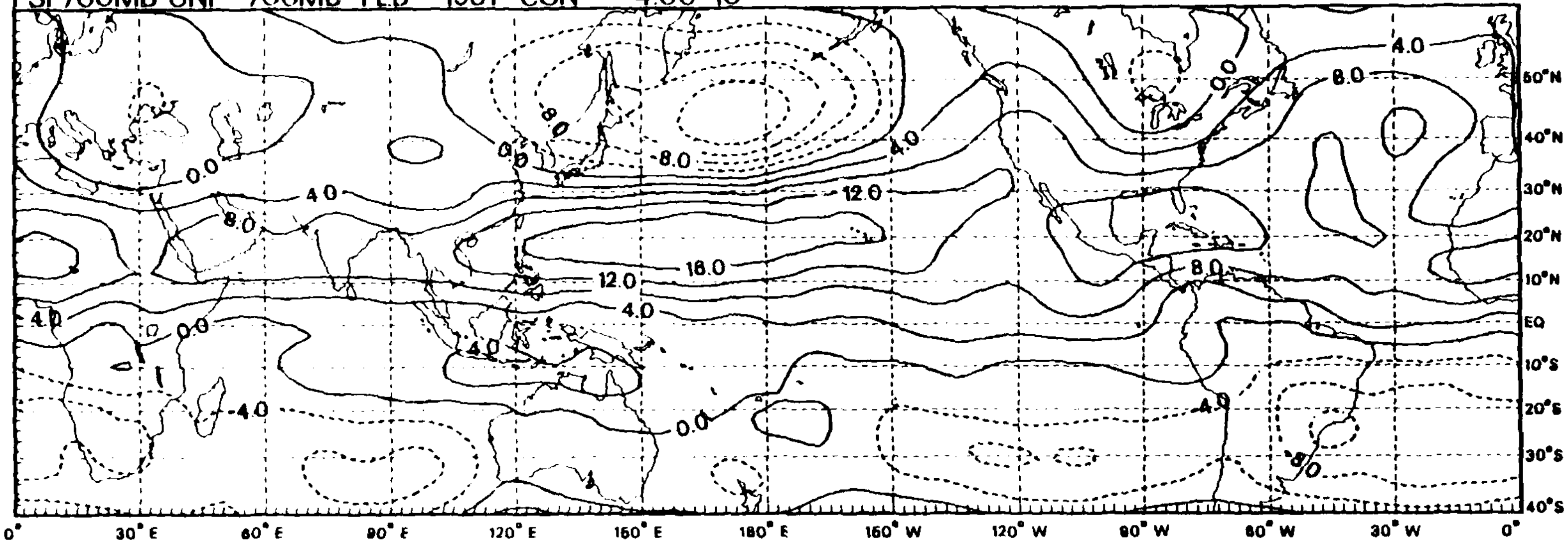



U,V 8081 UNF 700MB FEB 1981 DEV CON = $2.50*10^0$ SCALE = $5.000*10^0$

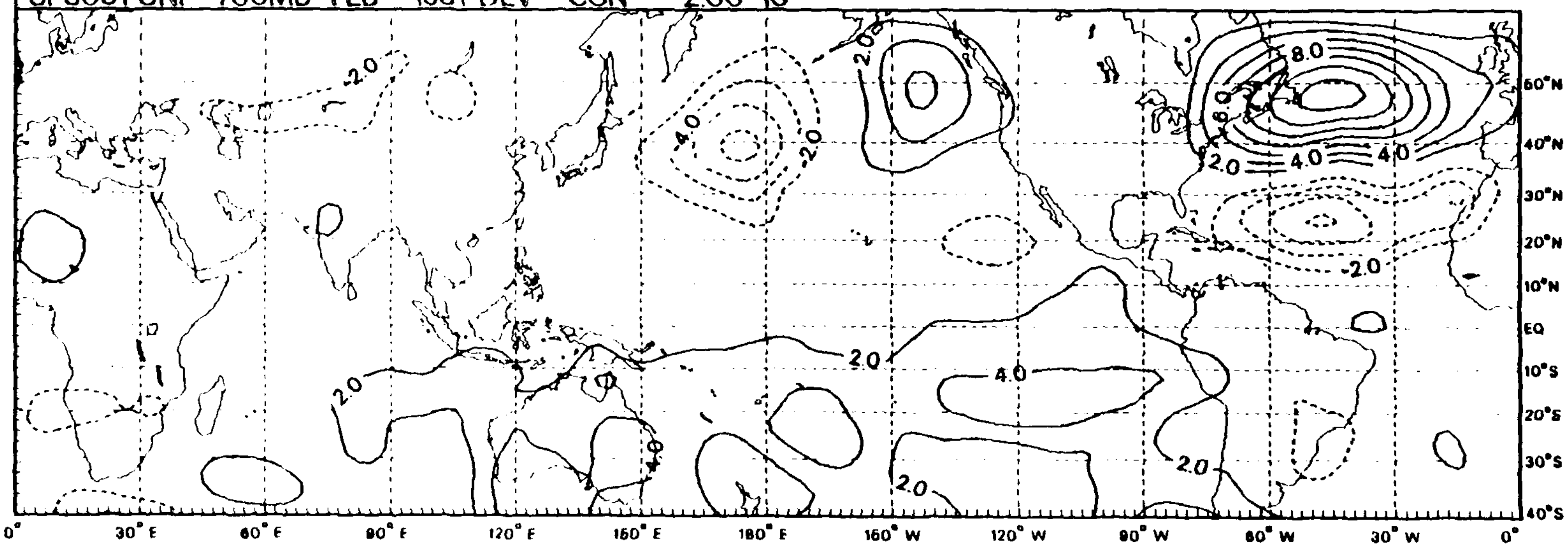


D62

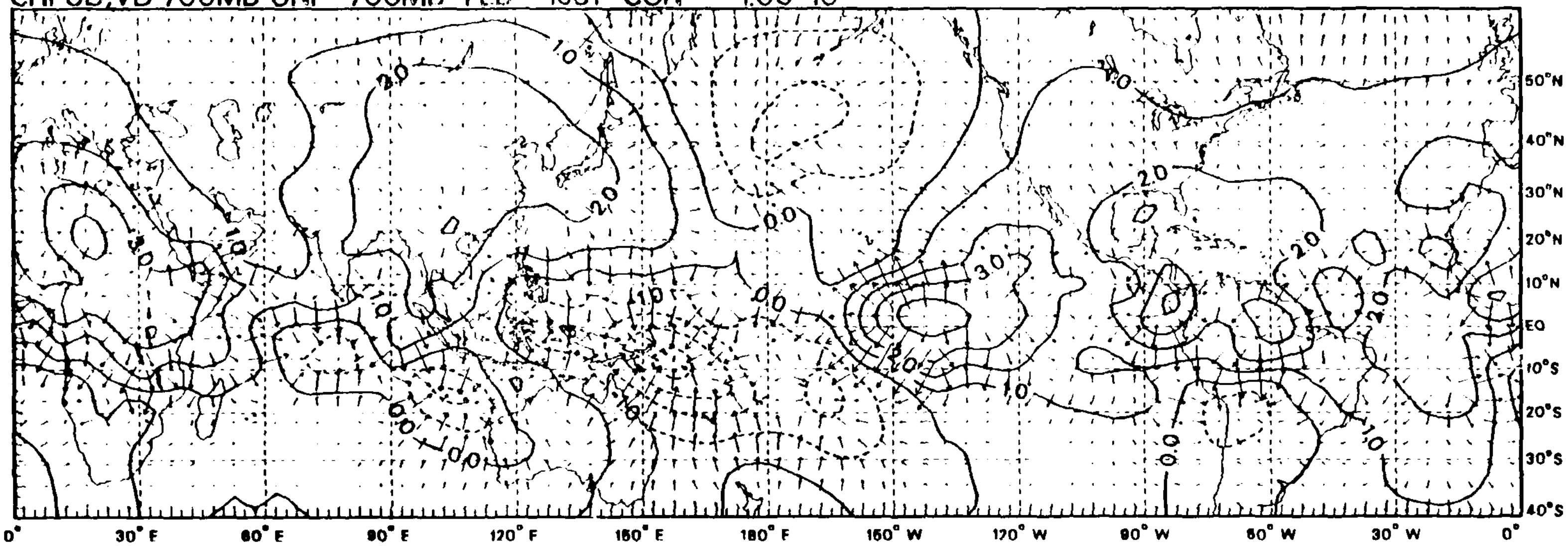
PSI 700MB UNF 700MB FEB 1981 CON = 4.00*10$^0$



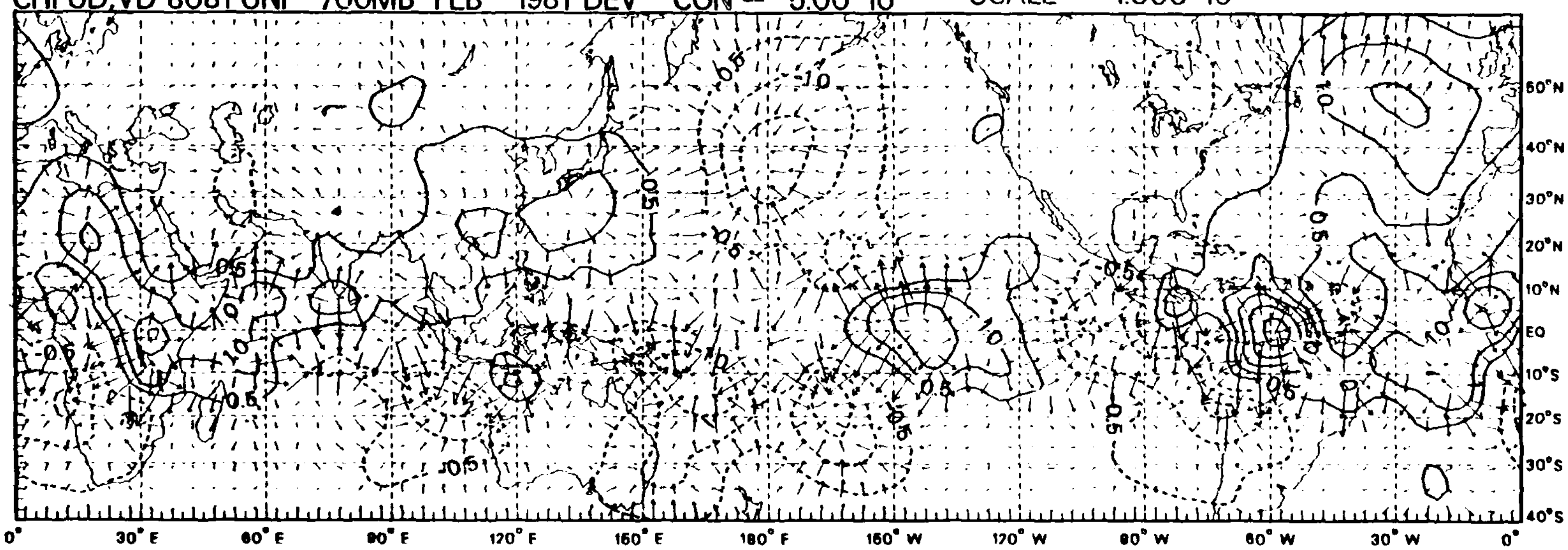

PSI 8081 UNF 700MB FEB 1981 DEV CON = 2.00*10$^0$



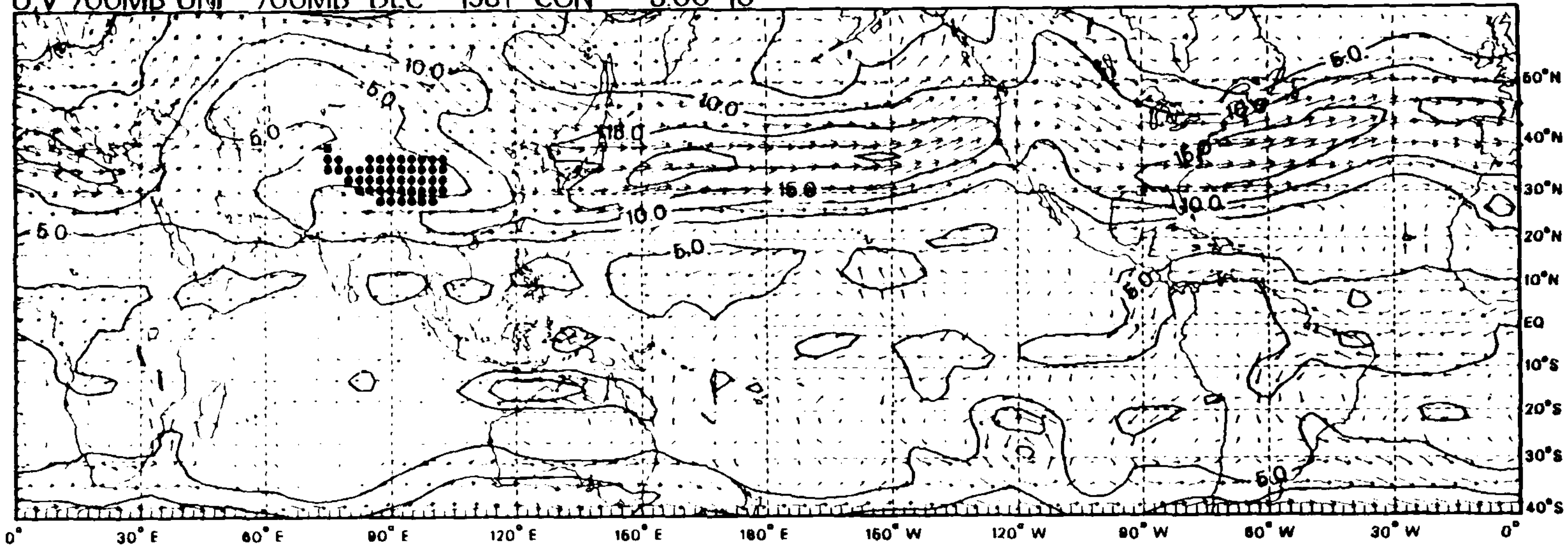
CHI UD,VD 700MB UNF 700MB FEB 1981 CON = $1.00*10^{0}$ SCALE = $2.000*10^{0}$



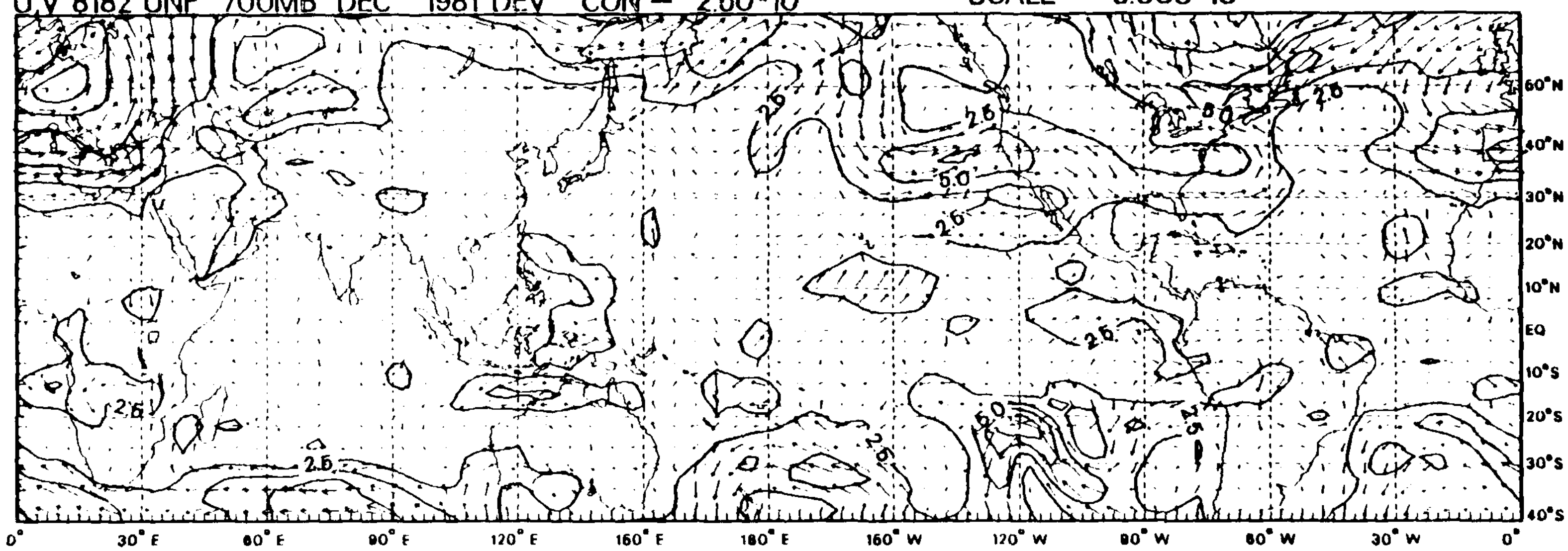

CHI UD,VD 8081 UNF 700MB FEB 1981 DEV CON = $5.00*10^{-1}$ SCALE = $1.000*10^{0}$



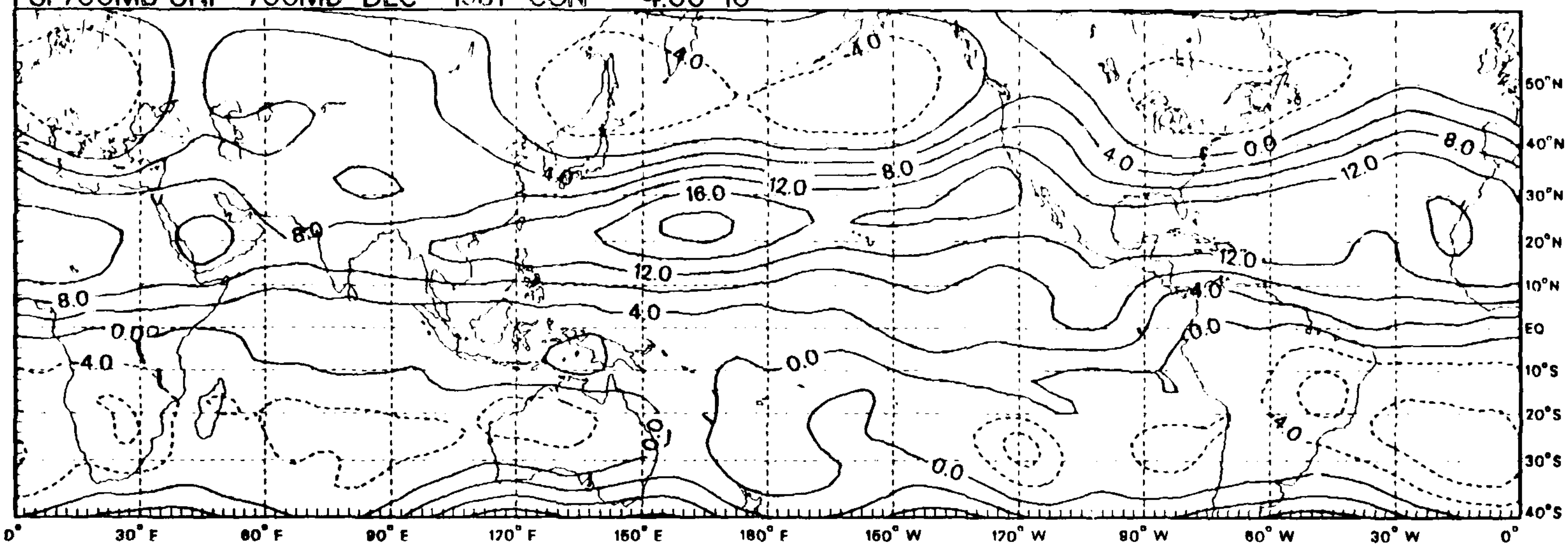
U,V 700MB UNF 700MB DEC 1981 CON = 5.00*10^0 SCALE = 1.000*10^1



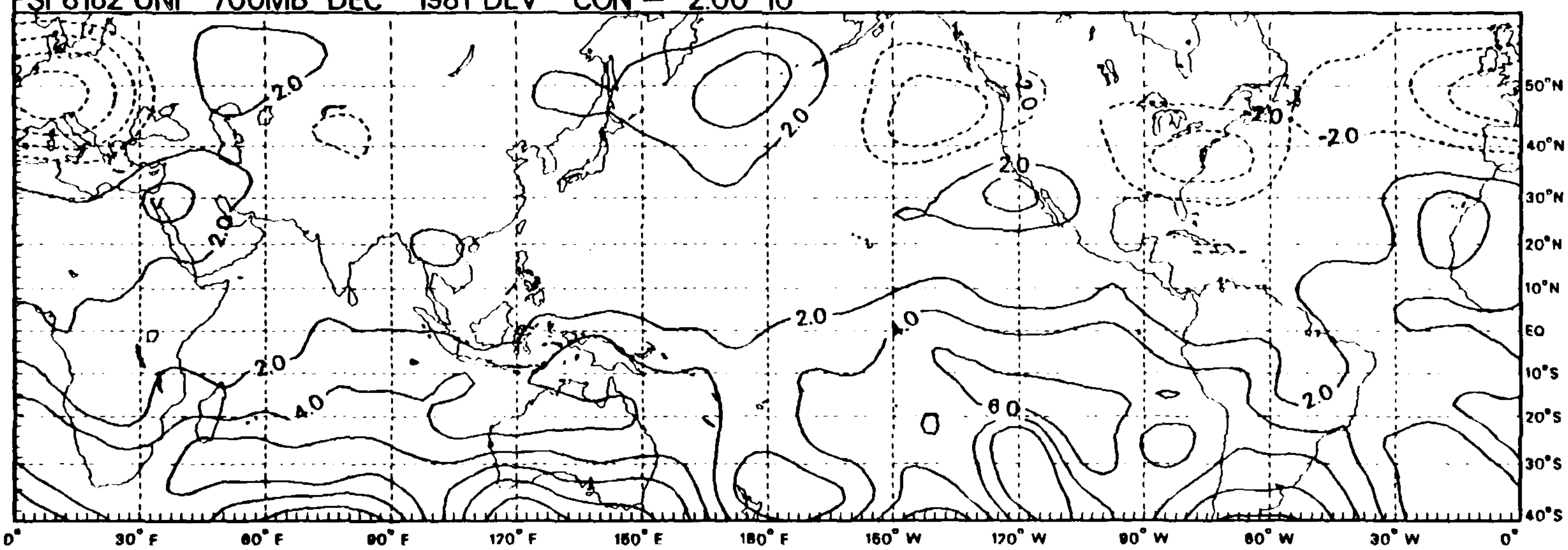

U,V 8182 UNF 700MB DEC 1981 DEV CON = 2.50*10^0 SCALE = 5.000*10^0



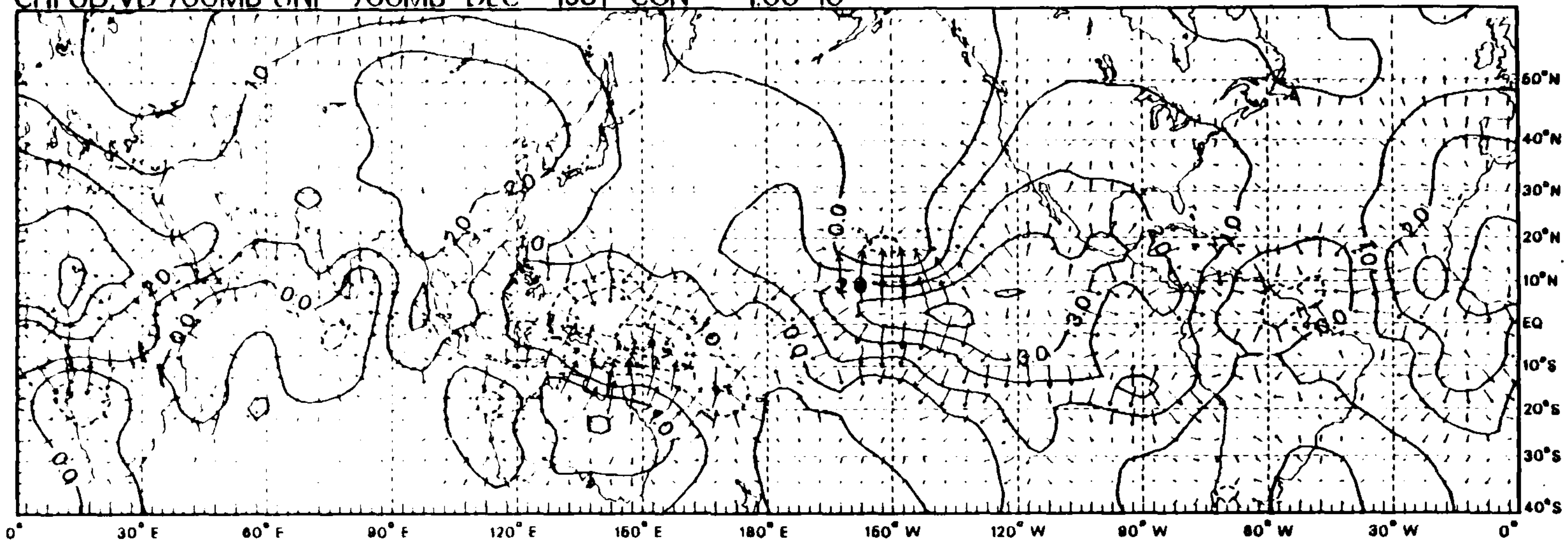
PSI 700MB UNF 700MB DEC 1981 CON = $4.00*10^0$



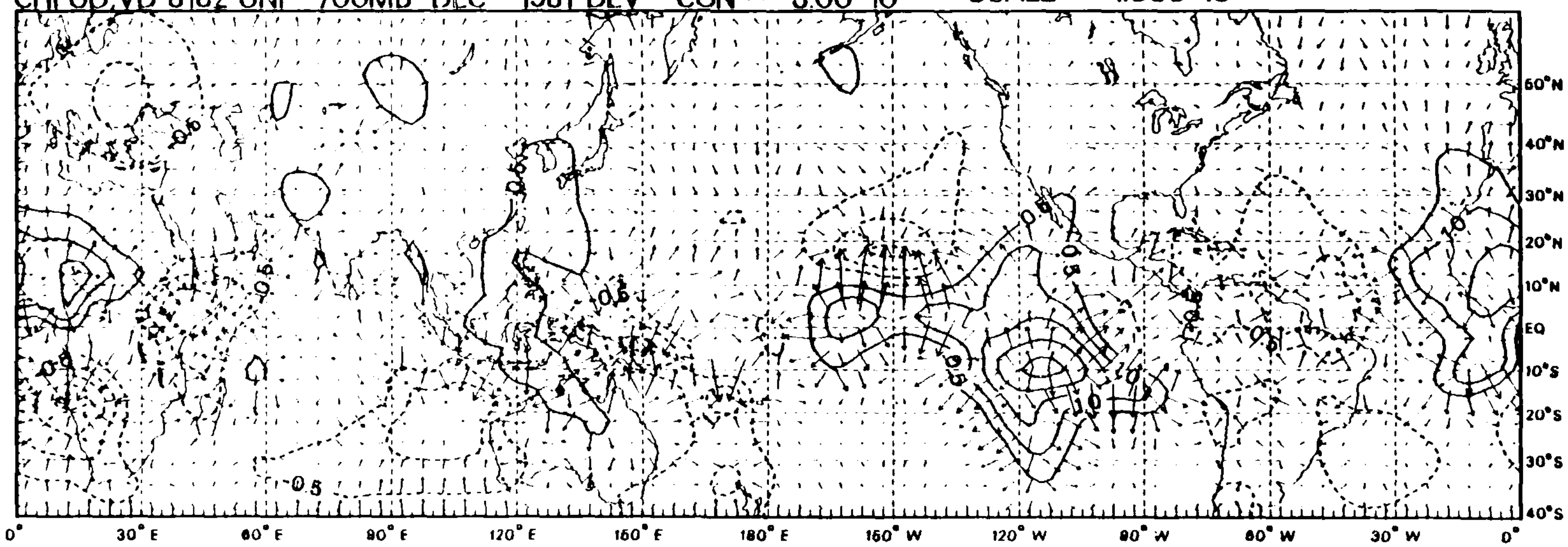

PSI 8182 UNF 700MB DEC 1981 DEV CON = $2.00*10^0$



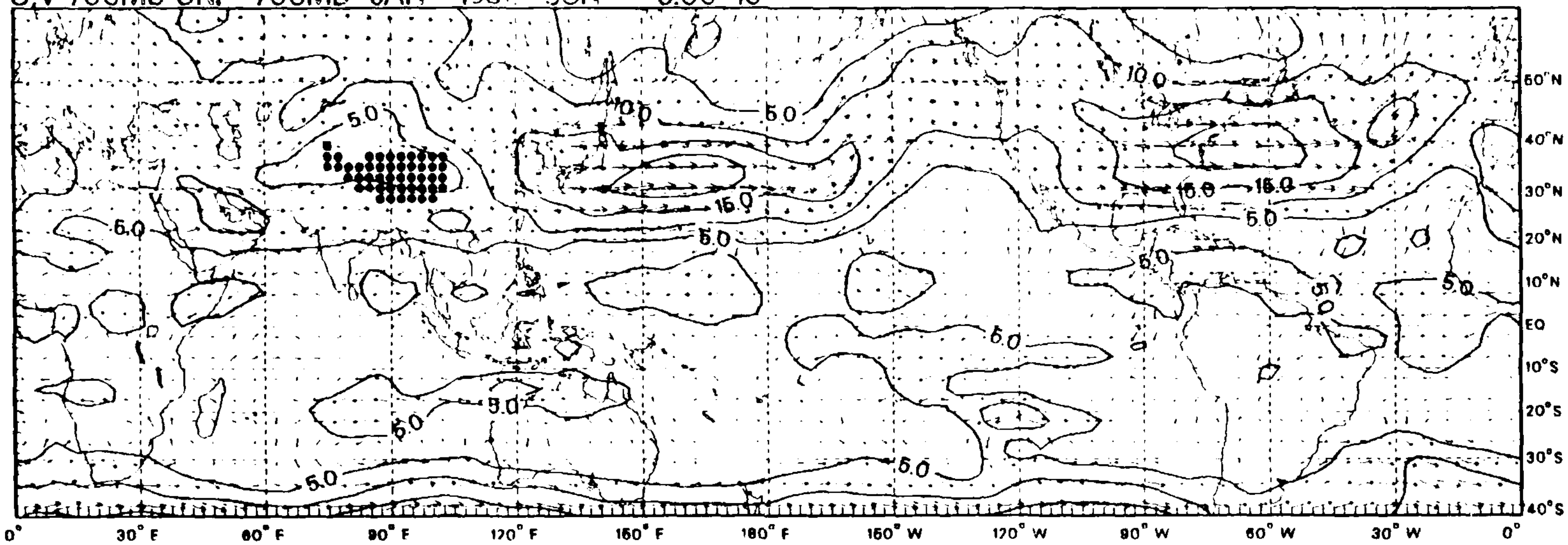
CHI UD,VD 700MB UNF 700MB DEC 1981 CON = $1.00*10^{0}$ SCALE = $2.000*10^{0}$ —



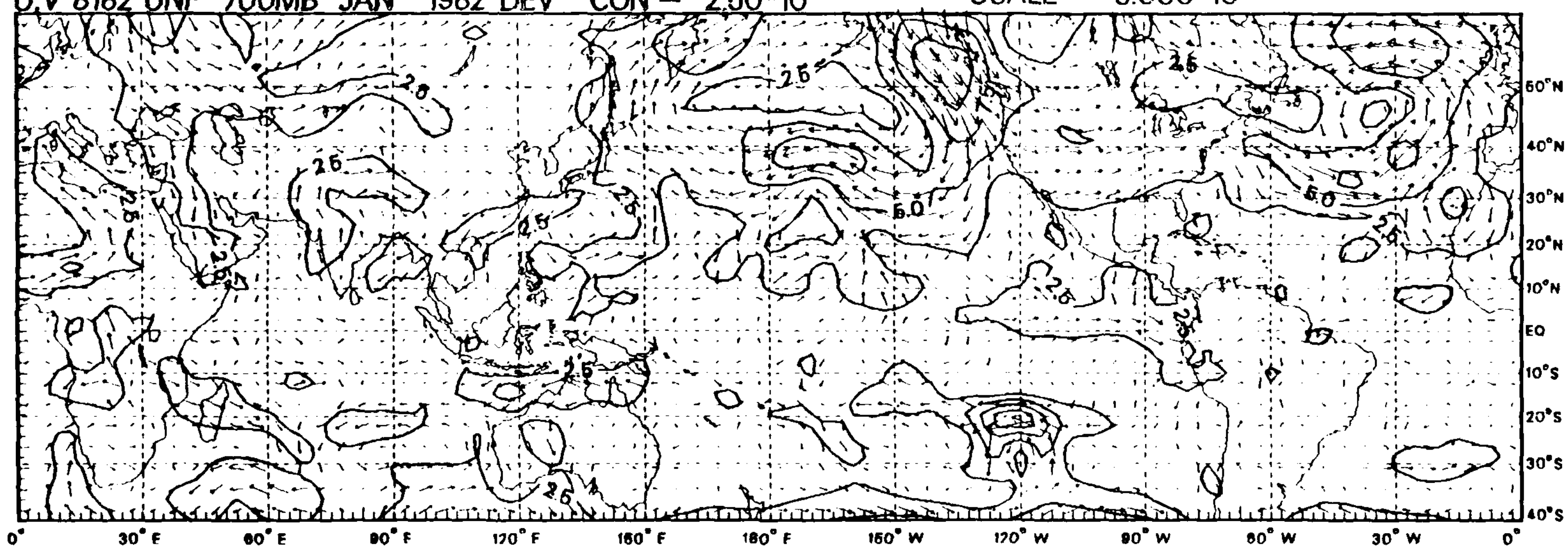

CHI UD,VD 8182 UNF 700MB DEC 1981 DEV CON = $5.00*10^{-1}$ SCALE = $1.000*10^{0}$ —



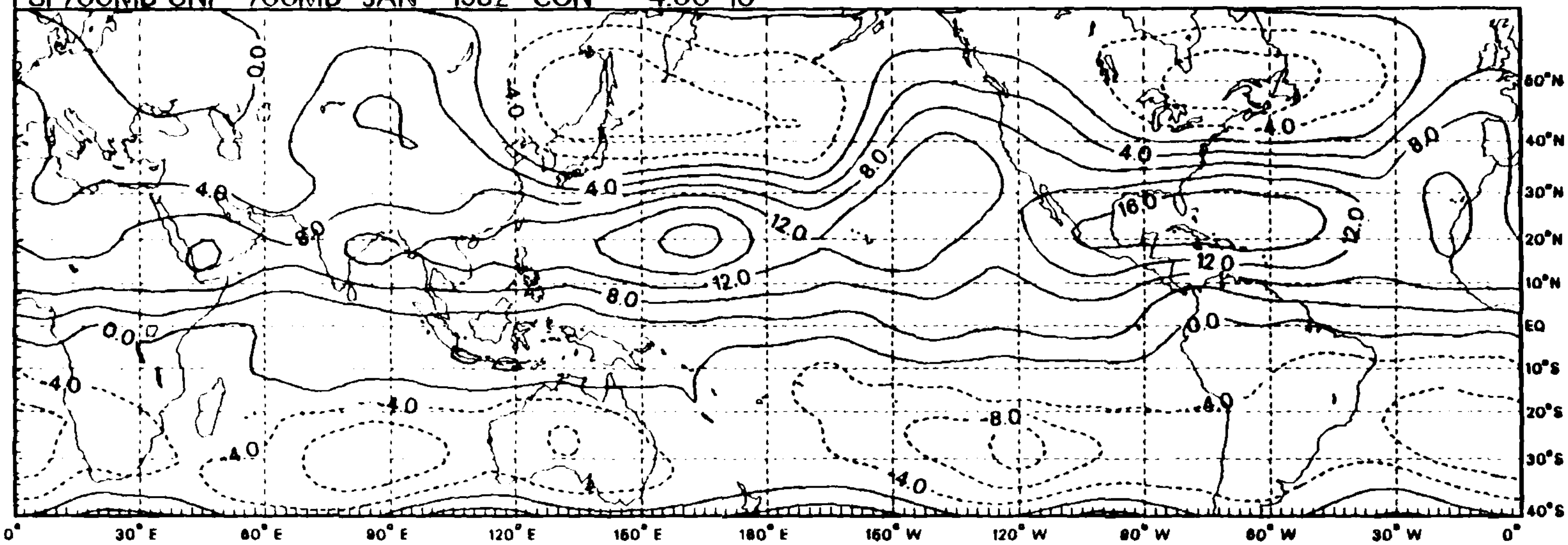
U,V 700MB UNF 700MB JAN 1982 CON = 5.00*10⁰ SCALE = 1.000*10¹



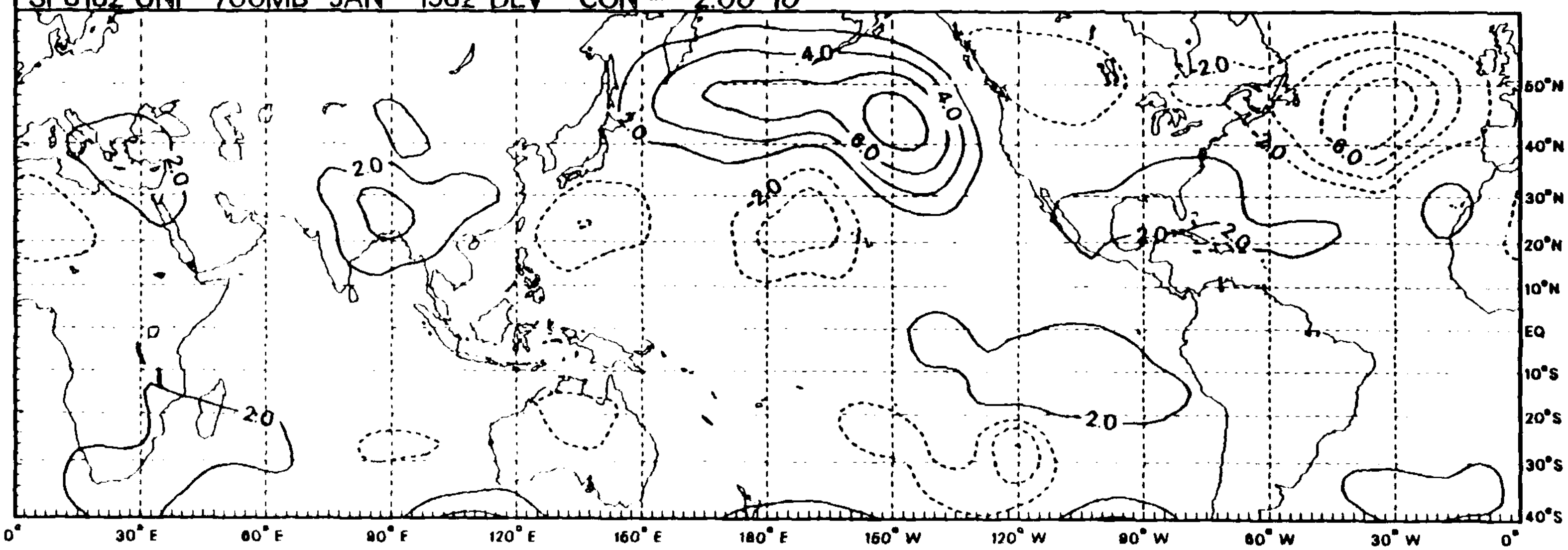
U,V 8182 UNF 700MB JAN 1982 DEV CON = 2.50*10⁰ SCALE = 5.000*10⁰



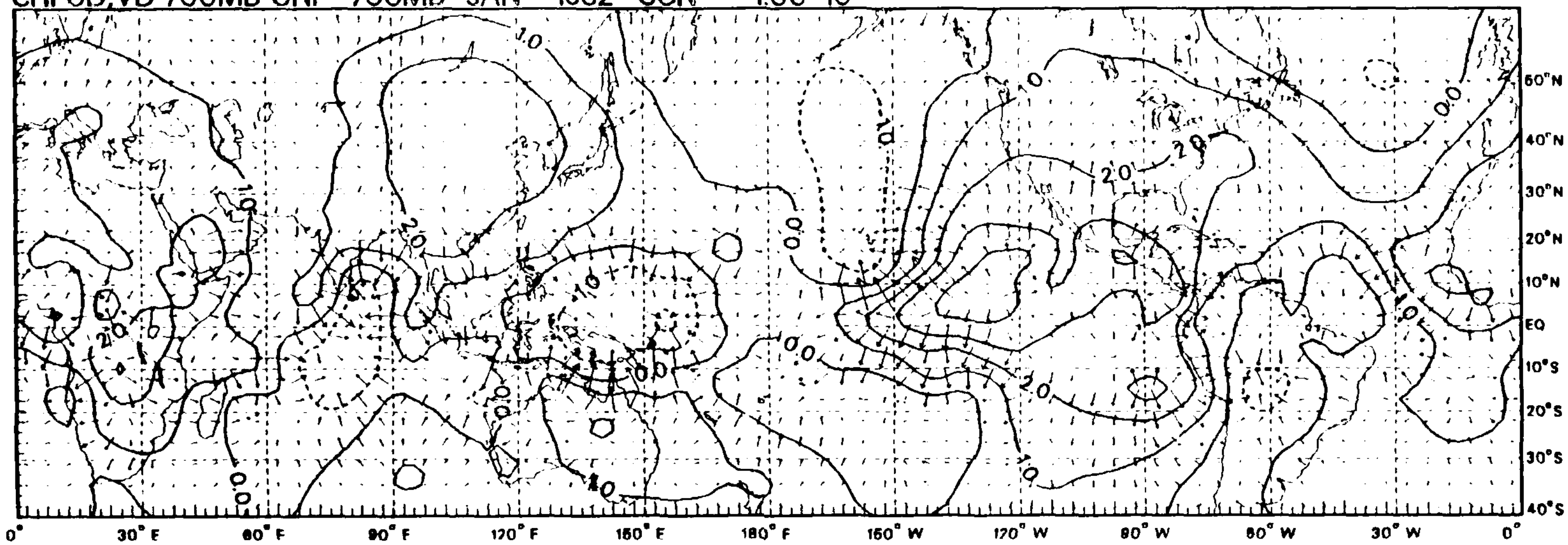
PSI 700MB UNF 700MB JAN 1982 CON = 4.00*10$^{0}$



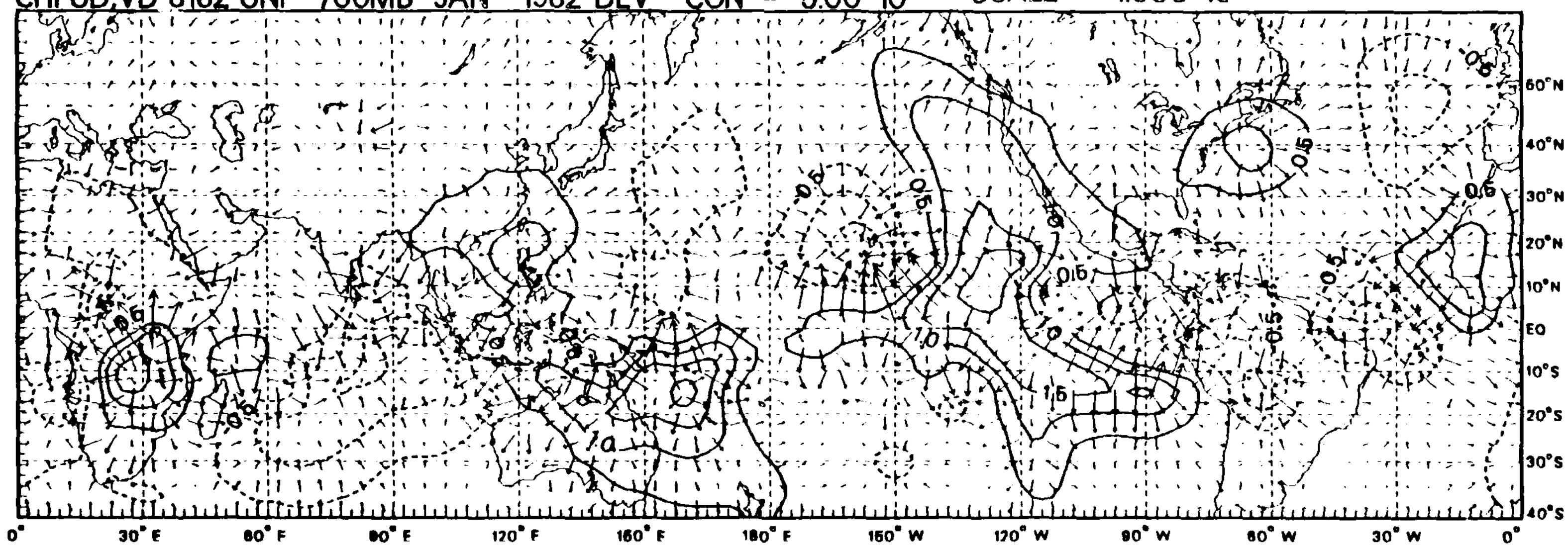

PSI 8182 UNF 700MB JAN 1982 DEV CON = 2.00*10$^{0}$



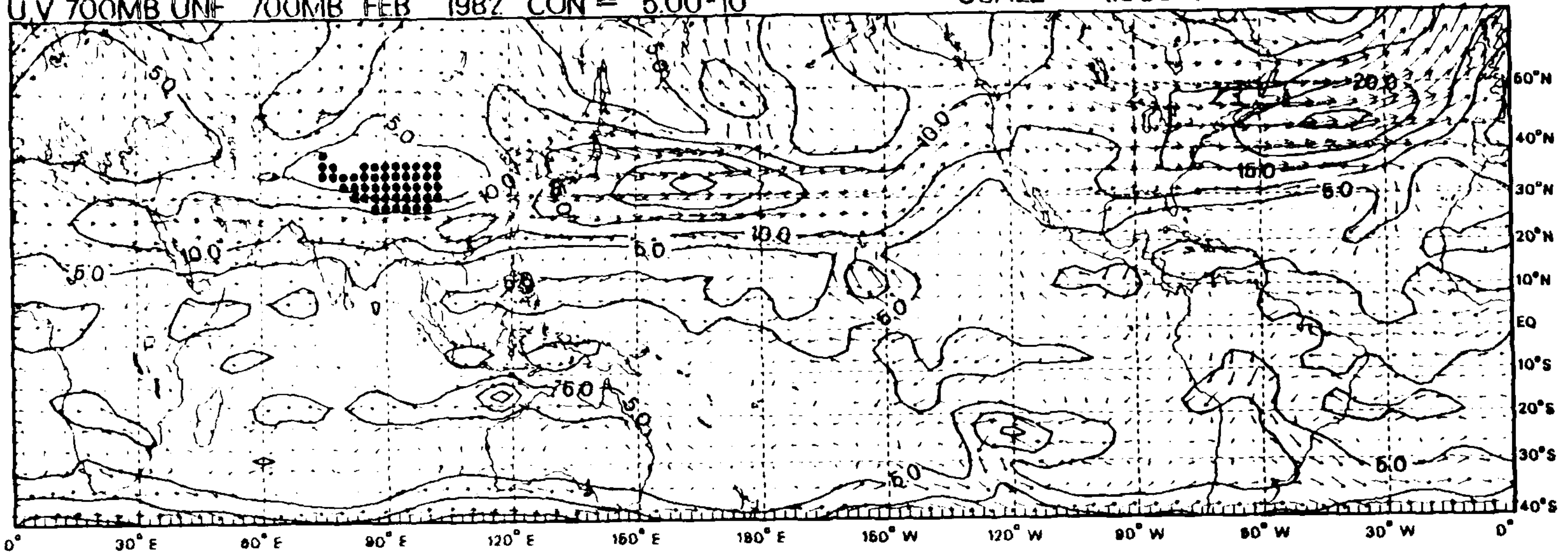
CHI UD,VD 700MB UNF 700MB JAN 1982 CON = $1.00*10^{0}$ SCALE = $2.000*10^{0}$



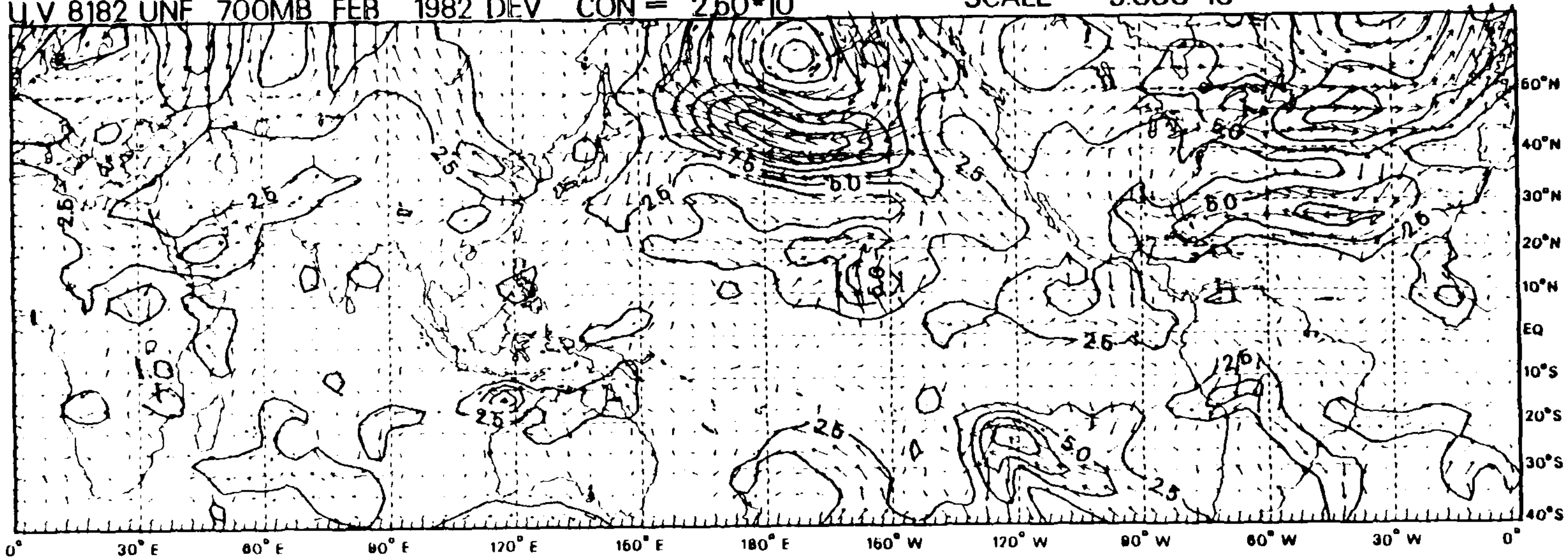

CHI UD,VD 8182 UNF 700MB JAN 1982 DEV CON = $5.00*10^{-1}$ SCALE = $1.000*10^{0}$



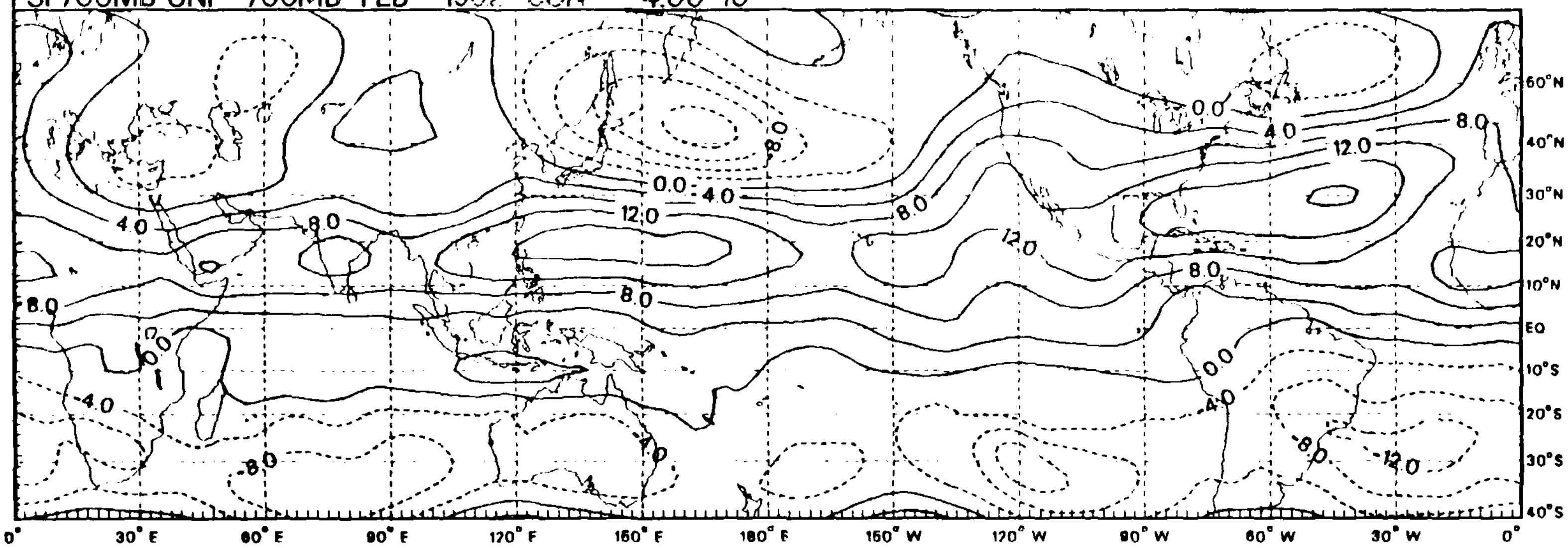
U,V 700MB UNF 700MB FEB 1982 CON = $5.00*10^0$ SCALE = $1.000*10^1$



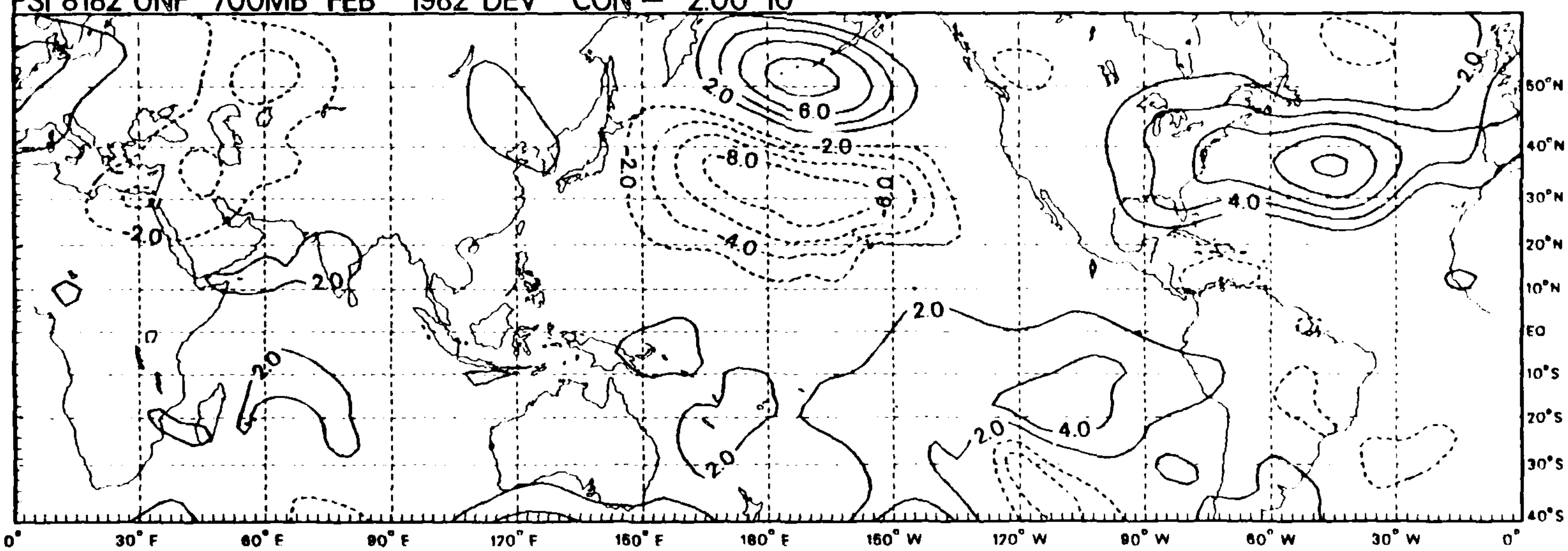

U,V 8182 UNF 700MB FEB 1982 DEV CON = $2.50*10^0$ SCALE = $5.000*10^0$



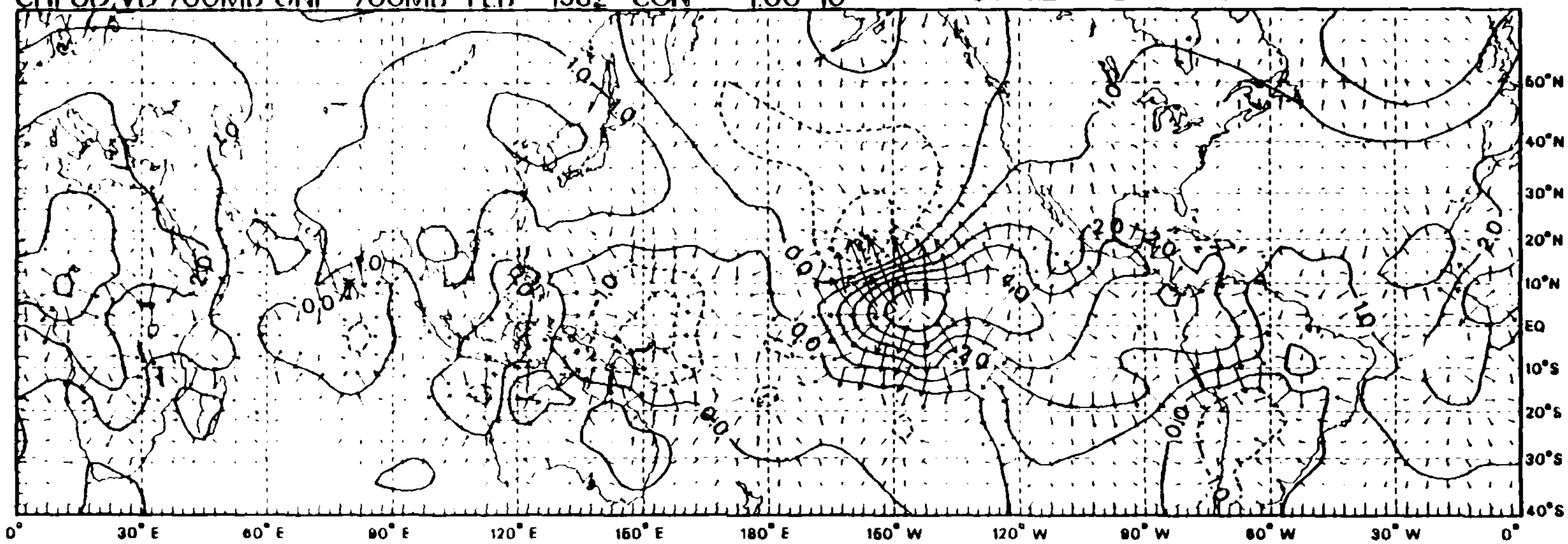
PSI 700MB UNF 700MB FEB 1982 CON = 4.00*10$^0$



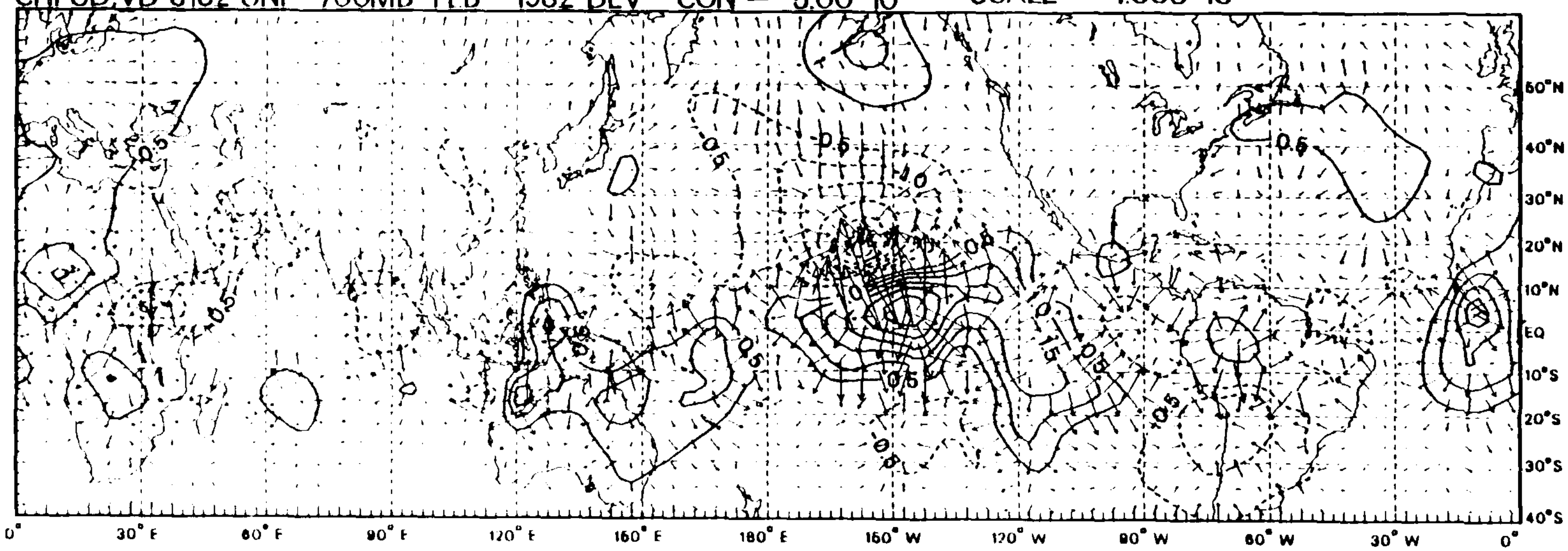
PSI 8182 UNF 700MB FEB 1982 DEV CON = 2.00*10$^0$



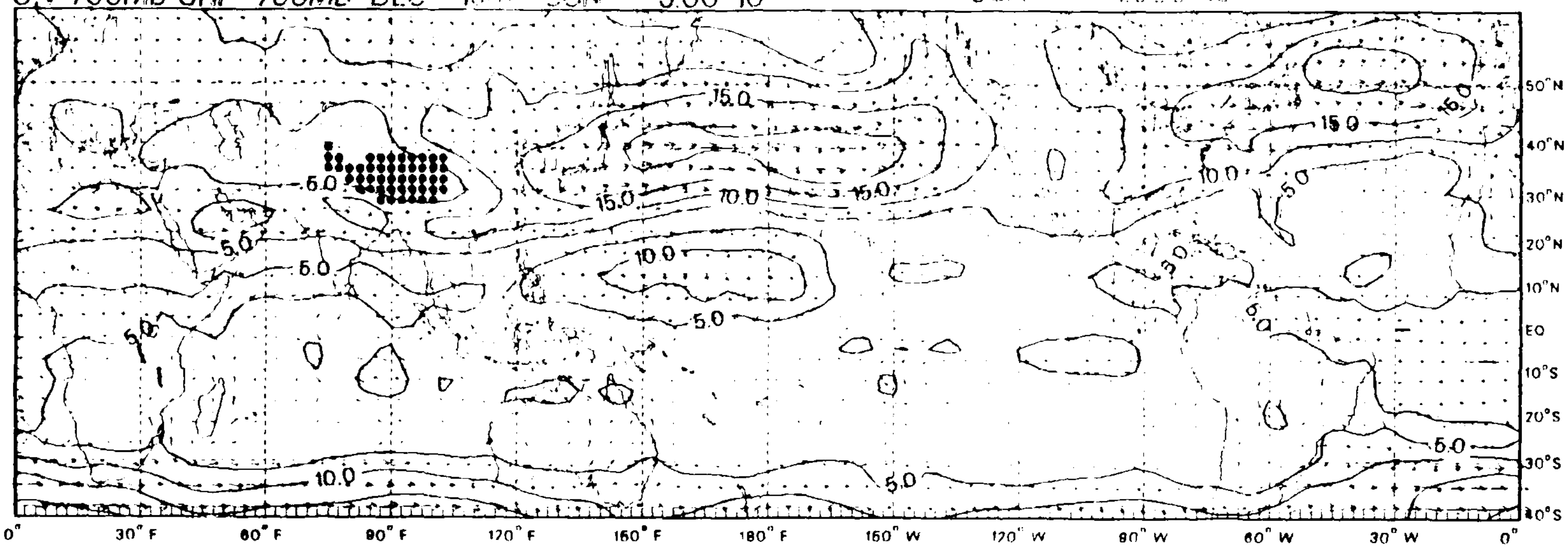
CHI UD,VD 700MB UNF 700MB FEB 1982 CON = 1.00*10$^0$ SCALE = 2.000*10$^0$



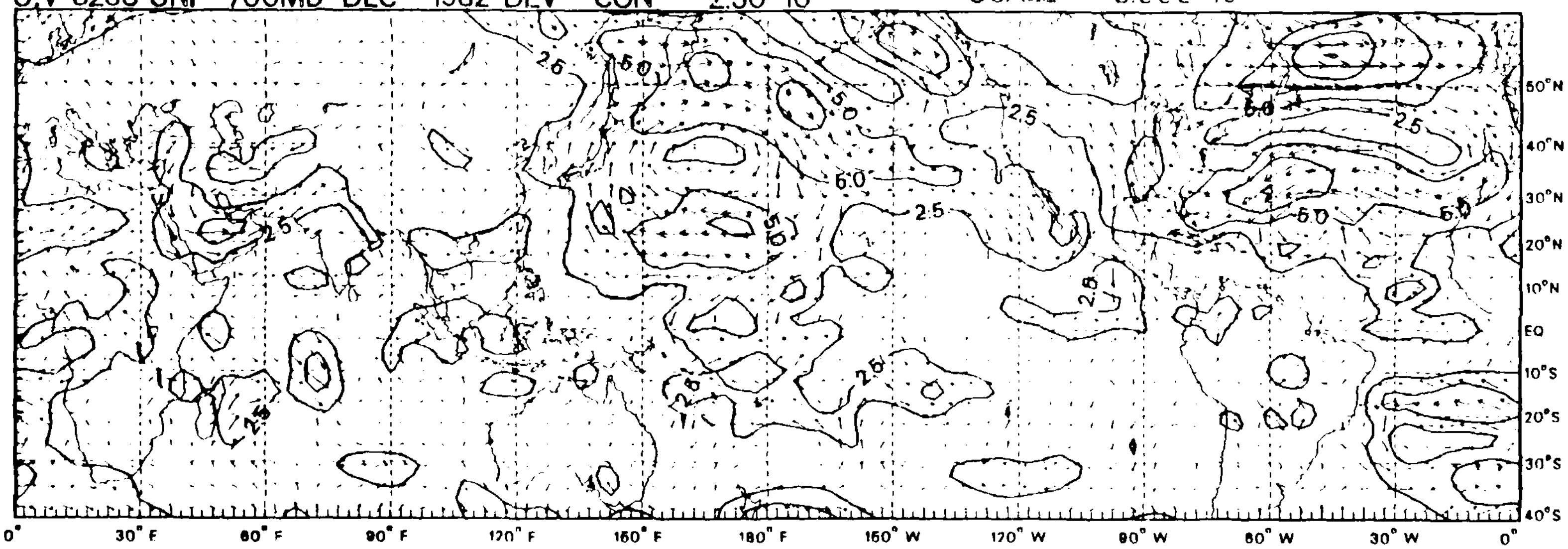

CHI UD,VD 8182 UNF 700MB FEB 1982 DEV CON = 5.00*10$^{-1}$ SCALE = 1.000*10$^0$



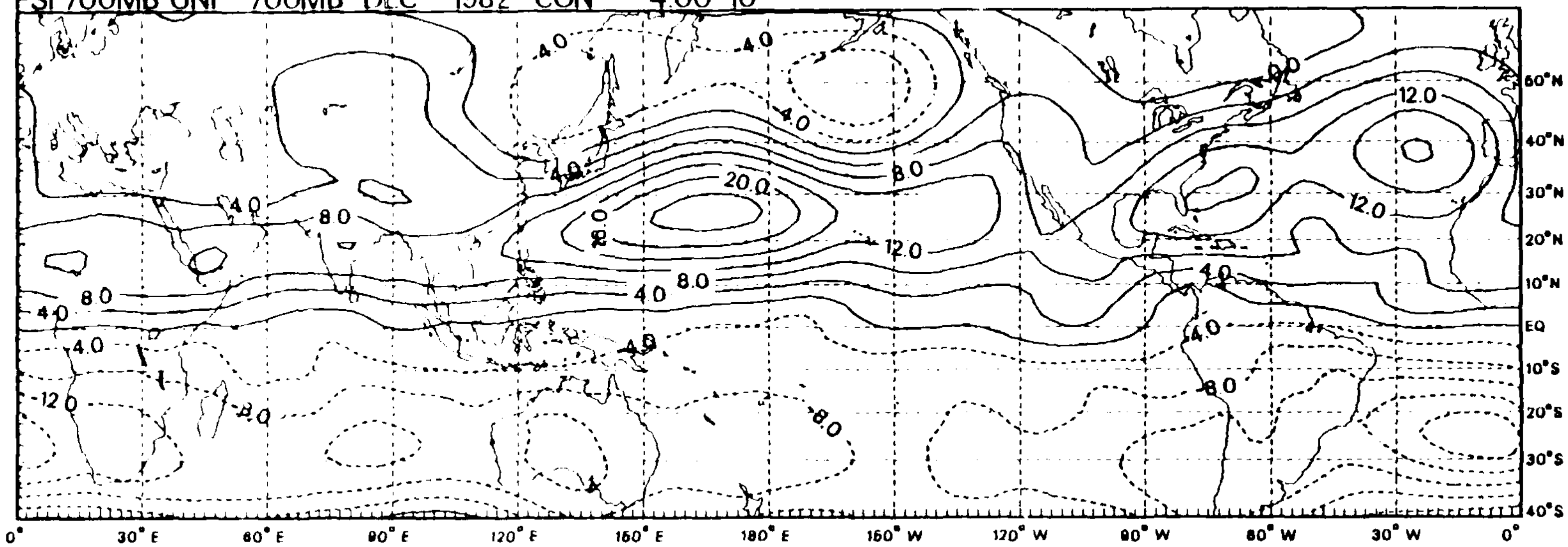
U,V 700MB UNF 700MB DEC 1982 CON = 5.00*10⁰ SCALE = 1.000*10¹



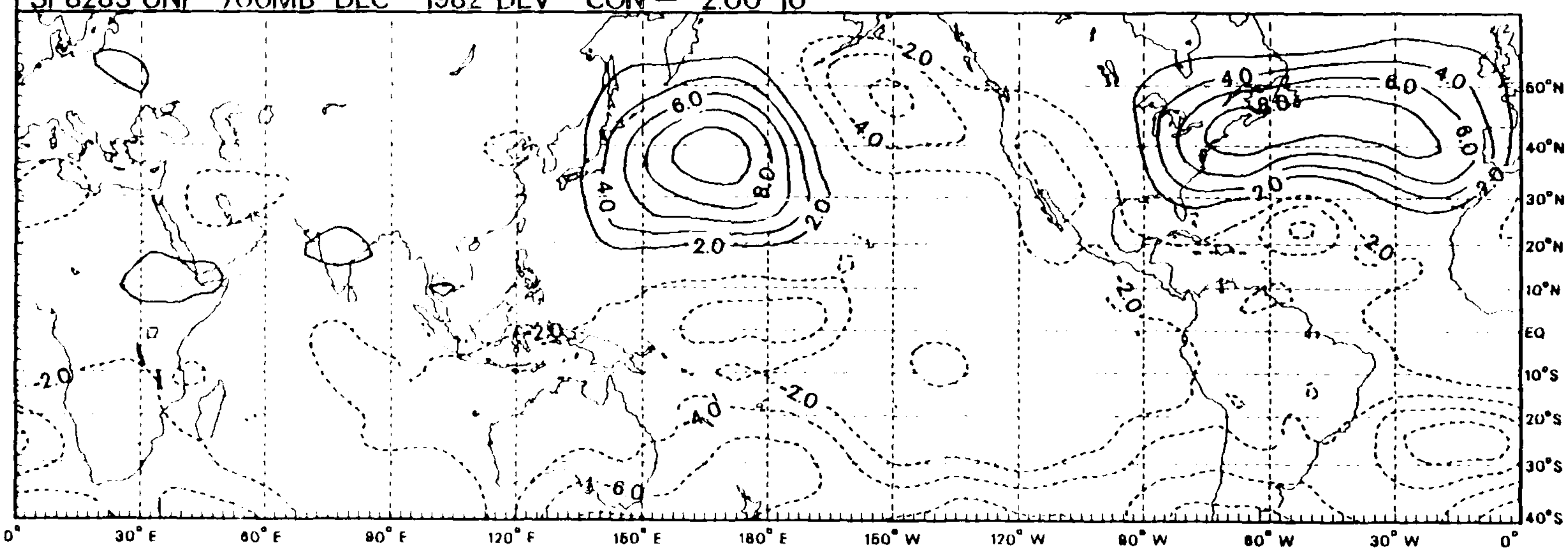

U,V 8283 UNF 700MB DEC 1982 DEV CON = 2.50*10⁰ SCALE = 5.000*10⁰



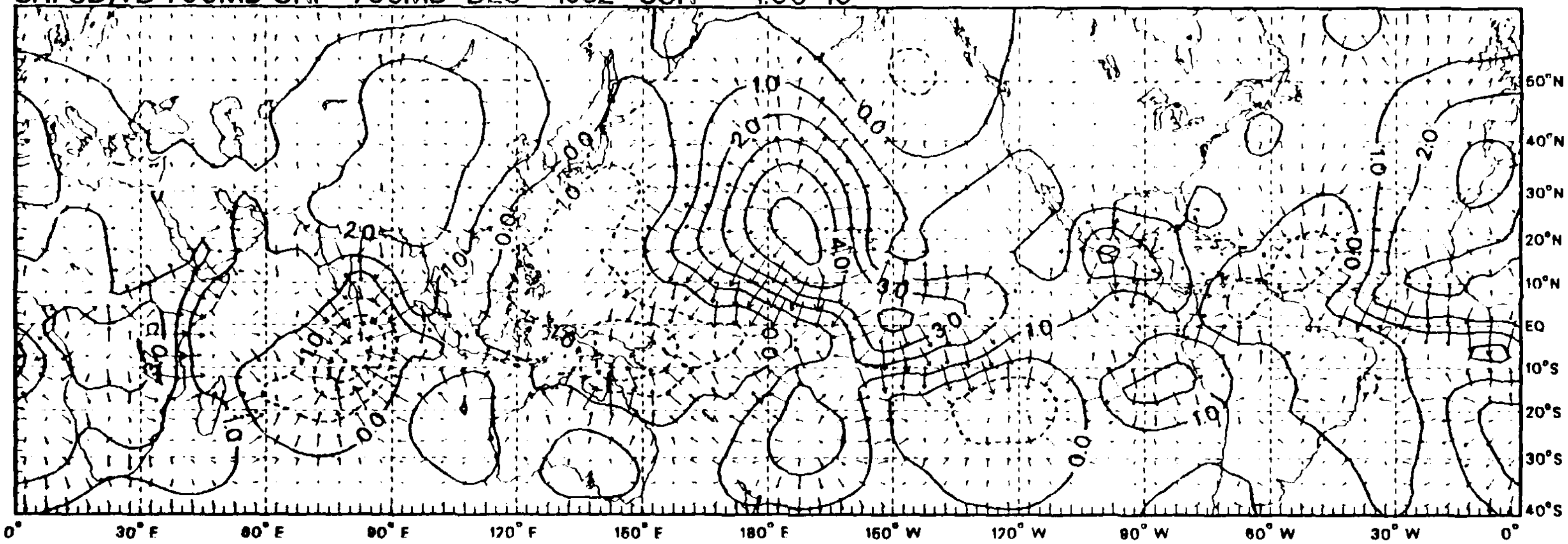
PSI 700MB UNF 700MB DEC 1982 CON = 4.00*10$^0$



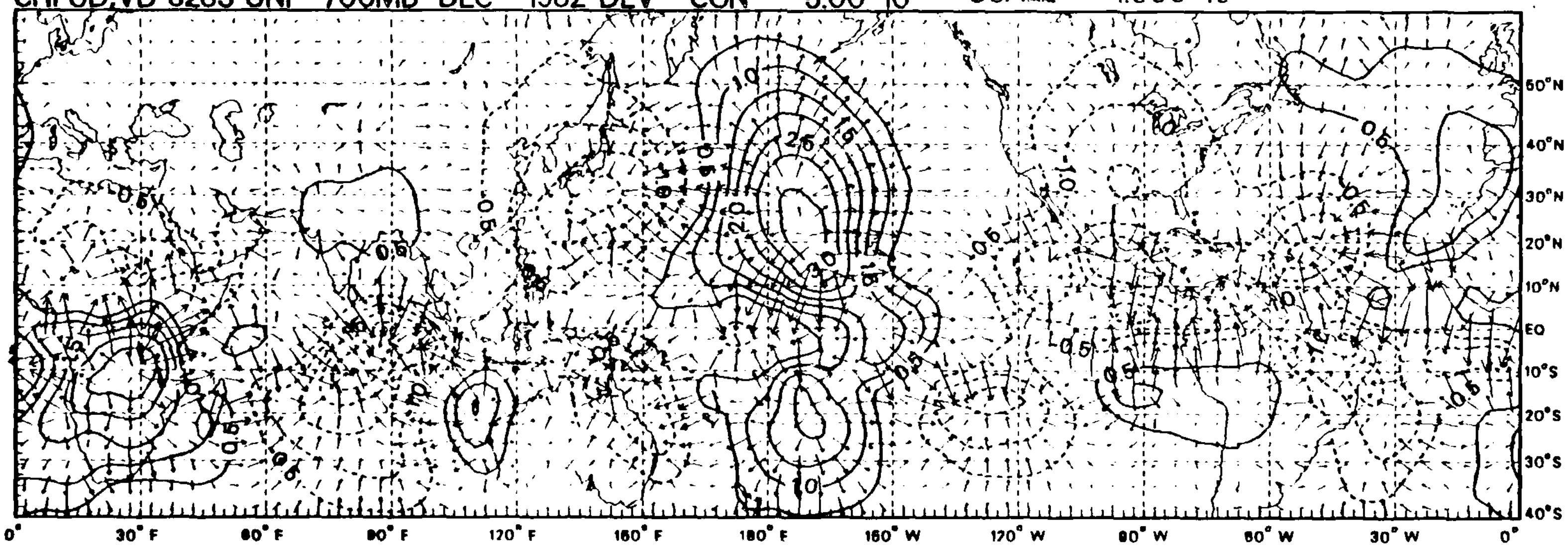
PSI 8283 UNF 700MB DEC 1982 DEV CON = 2.00*10$^0$



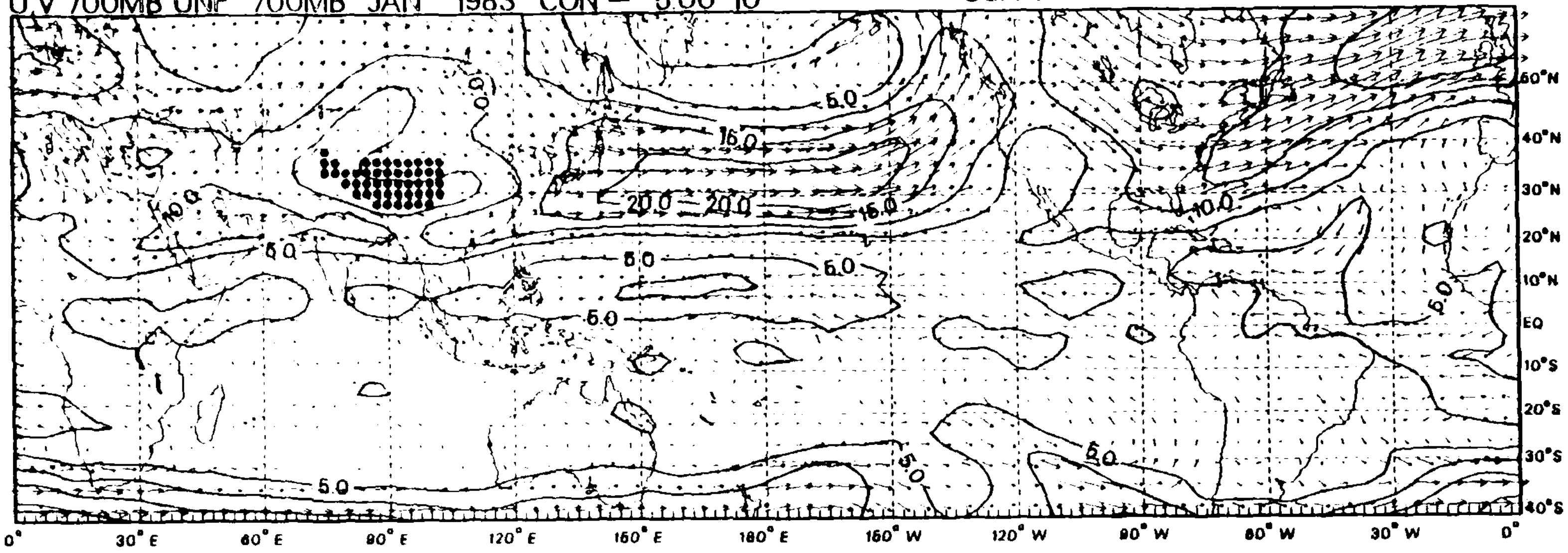
CHI UD,VD 700MB UNF 700MB DEC 1982 CON = $1.00*10^{0}$ SCALE = $2.000*10^{0}$



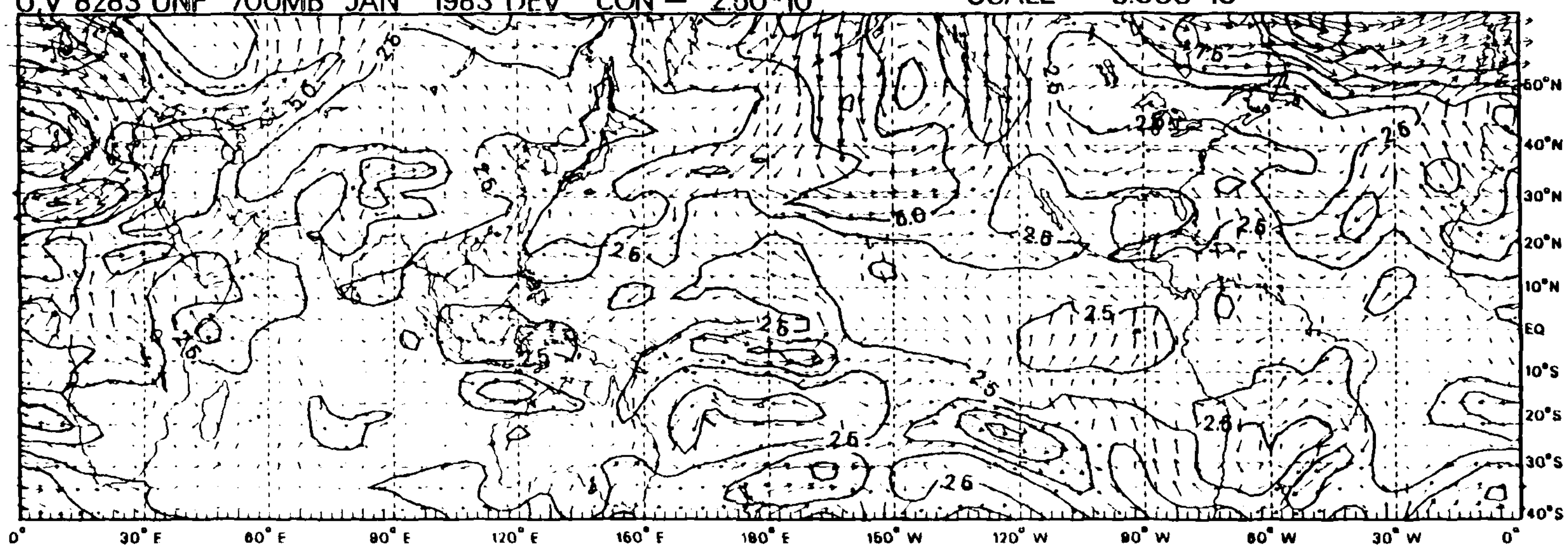

CHI UD,VD 8283 UNF 700MB DEC 1982 DEV CON = $5.00*10^{-1}$ SCALE = $1.000*10^{0}$



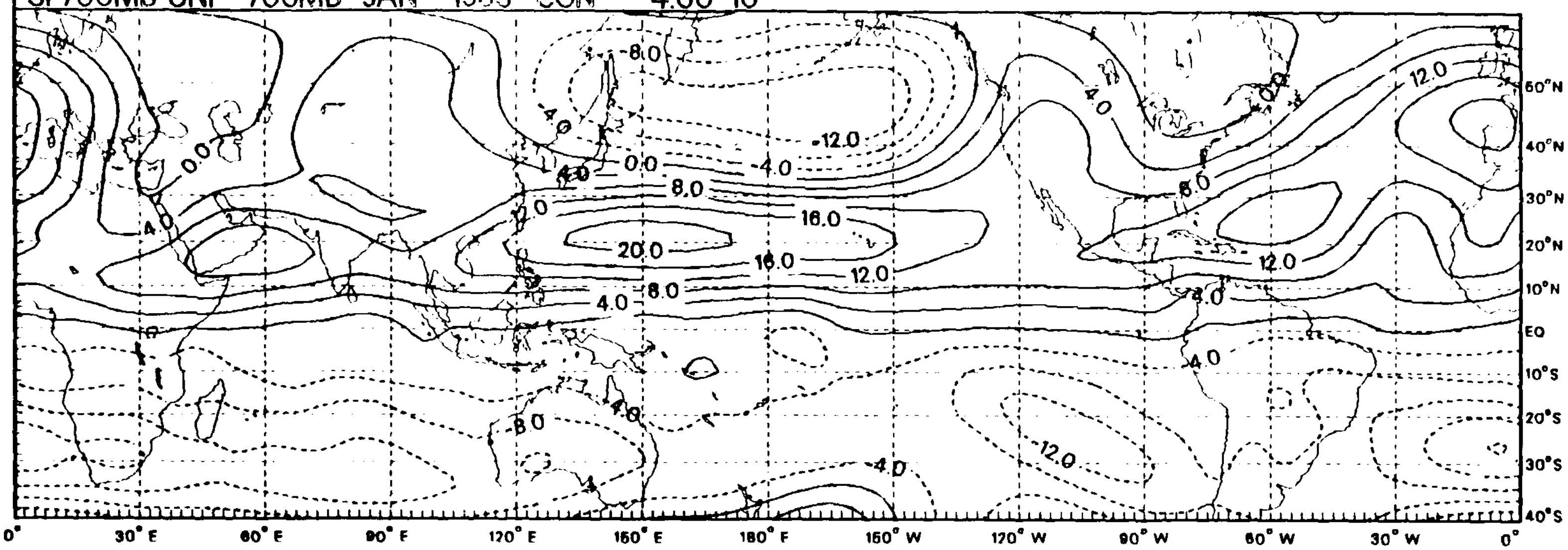
U,V 700MB UNF 700MB JAN 1983 CON = 5.00*10$^{0}$ SCALE = 1.000*10$^{1}$



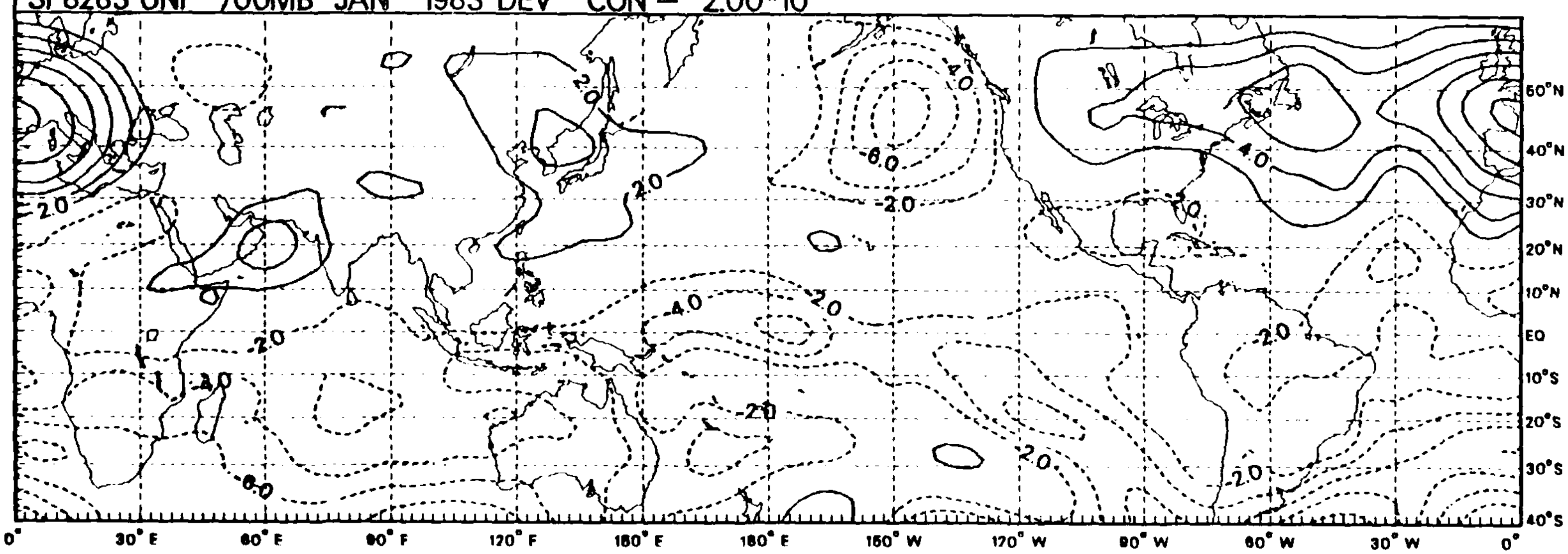

U,V 8283 UNF 700MB JAN 1983 DEV CON = 2.50*10$^{0}$ SCALE = 5.000*10$^{0}$



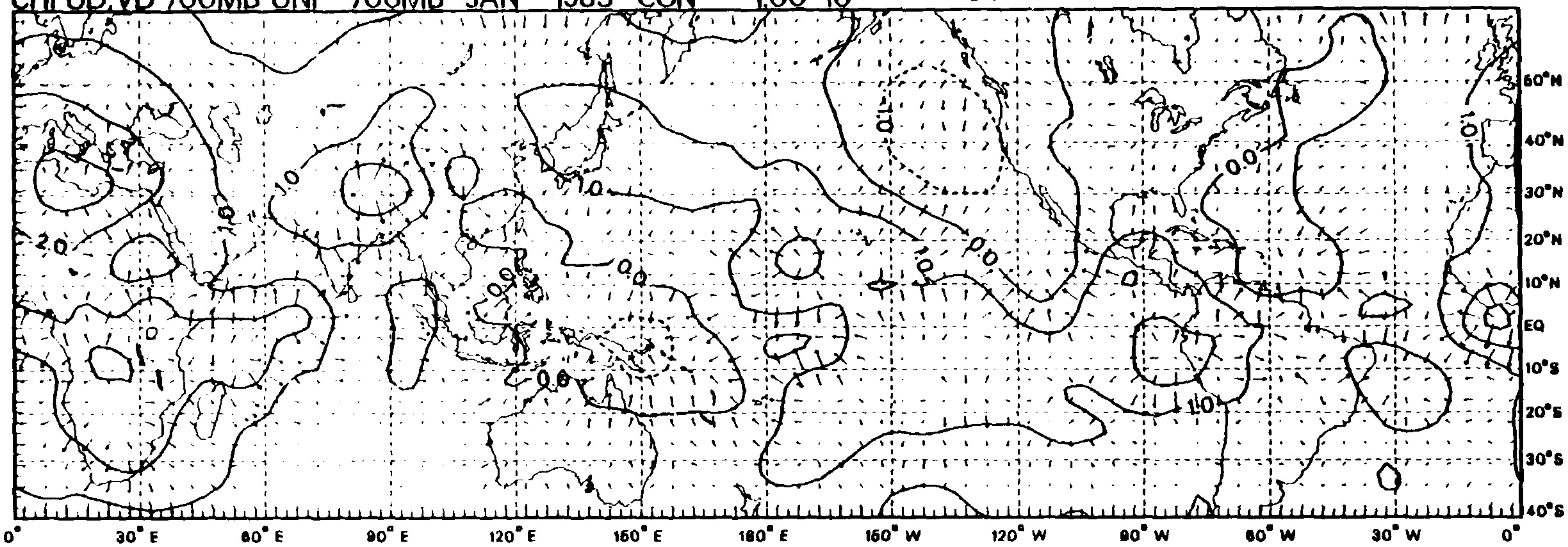
PSI 700MB UNF 700MB JAN 1983 CON = 4.00*10$^0$



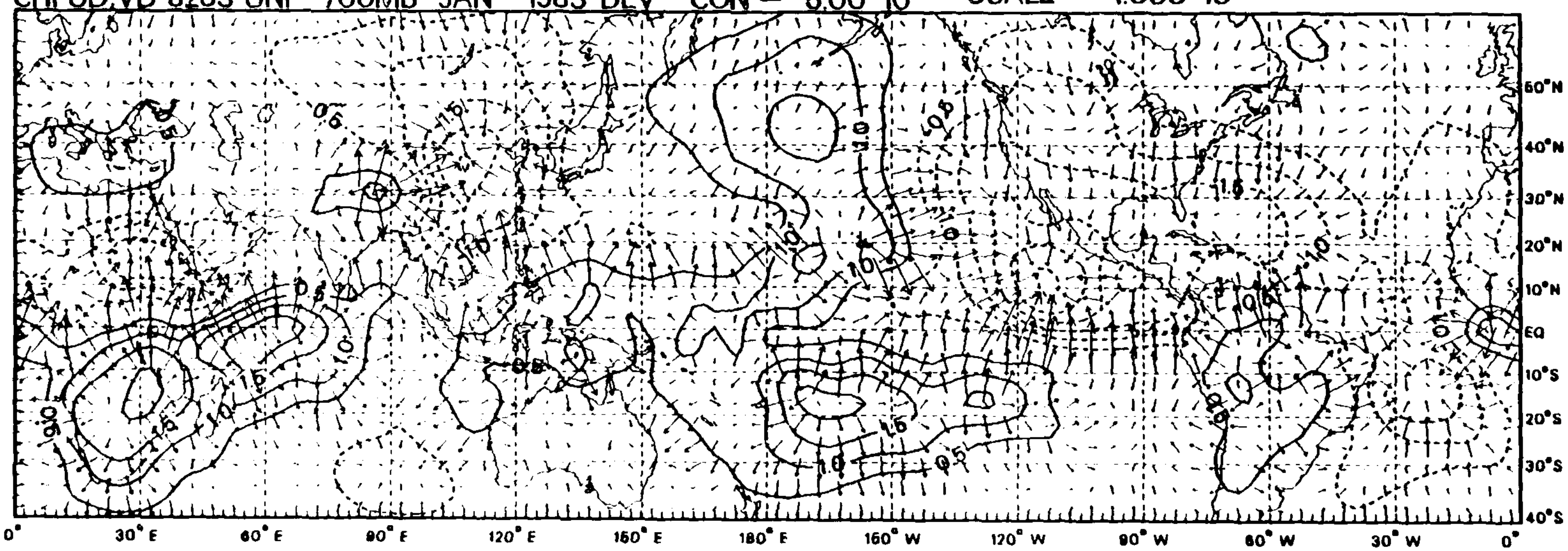

PSI 8283 UNF 700MB JAN 1983 DEV CON = 2.00*10$^0$



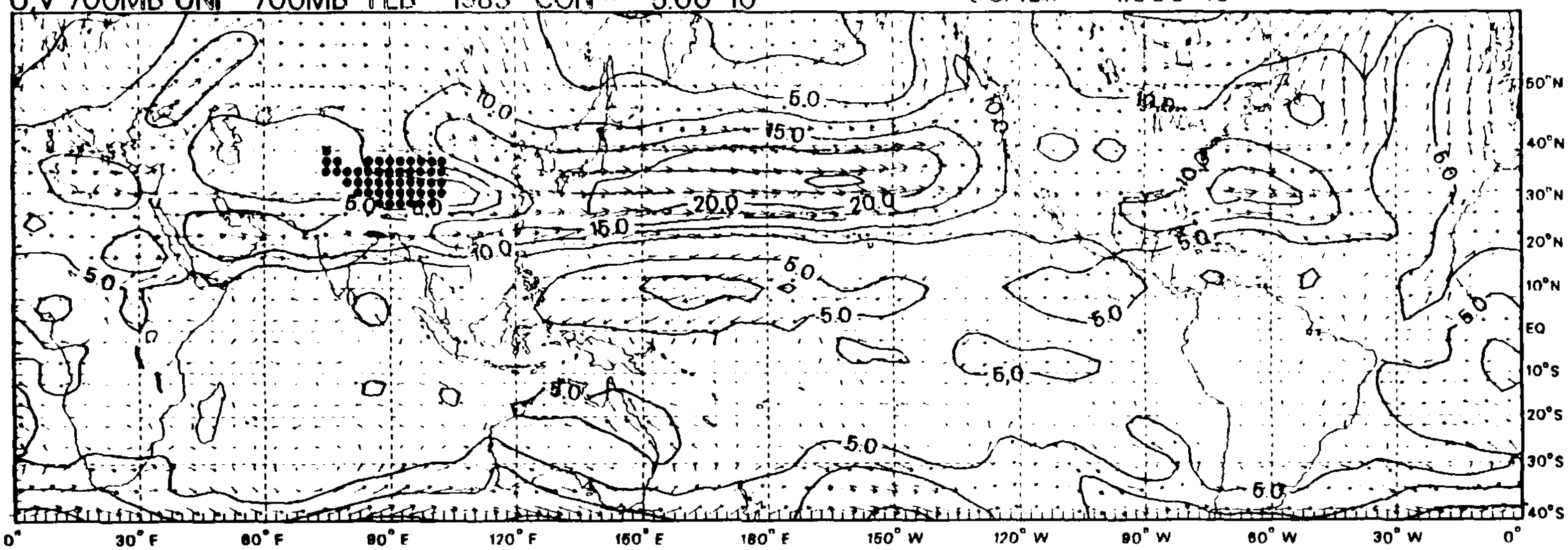
CHI UD,VD 700MB UNF 700MB JAN 1983 CON = 1.00*10$^0$ SCALE = 2.000*10$^0$ —



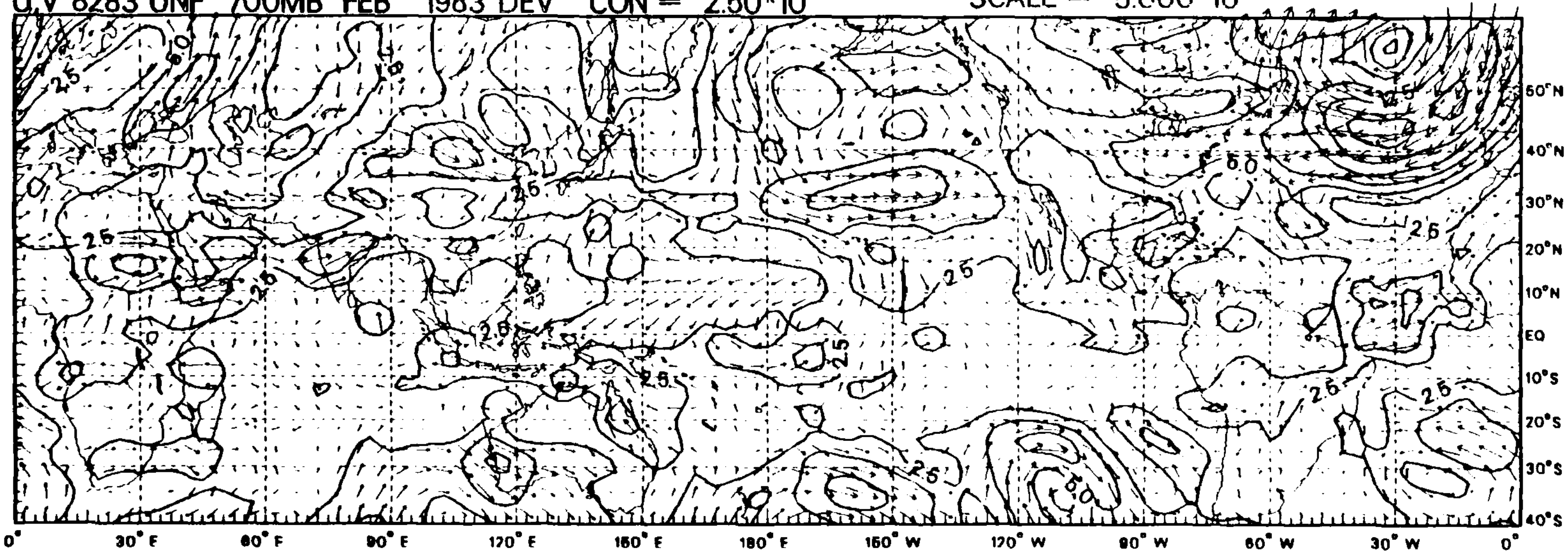

CHI UD,VD 8283 UNF 700MB JAN 1983 DEV CON = 5.00*10$^{-1}$ SCALE = 1.000*10$^0$ —



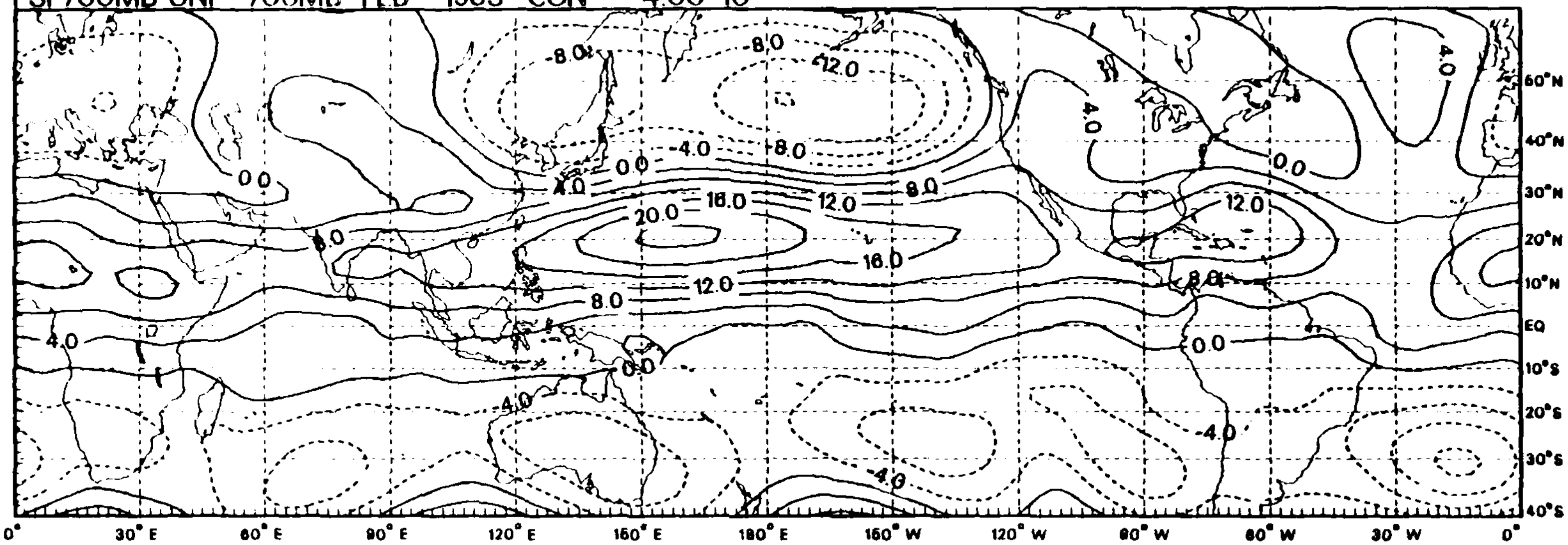
U,V 700MB UNF 700MB FEB 1983 CON = $5.00*10^{0}$ SCALE = $1.000*10^{1}$




U,V 8283 UNF 700MB FEB 1983 DEV CON = $2.50*10^{0}$ SCALE = $5.000*10^{0}$



PSI 700MB UNF 700MB FEB 1983 CON = 4.00*10$^0$

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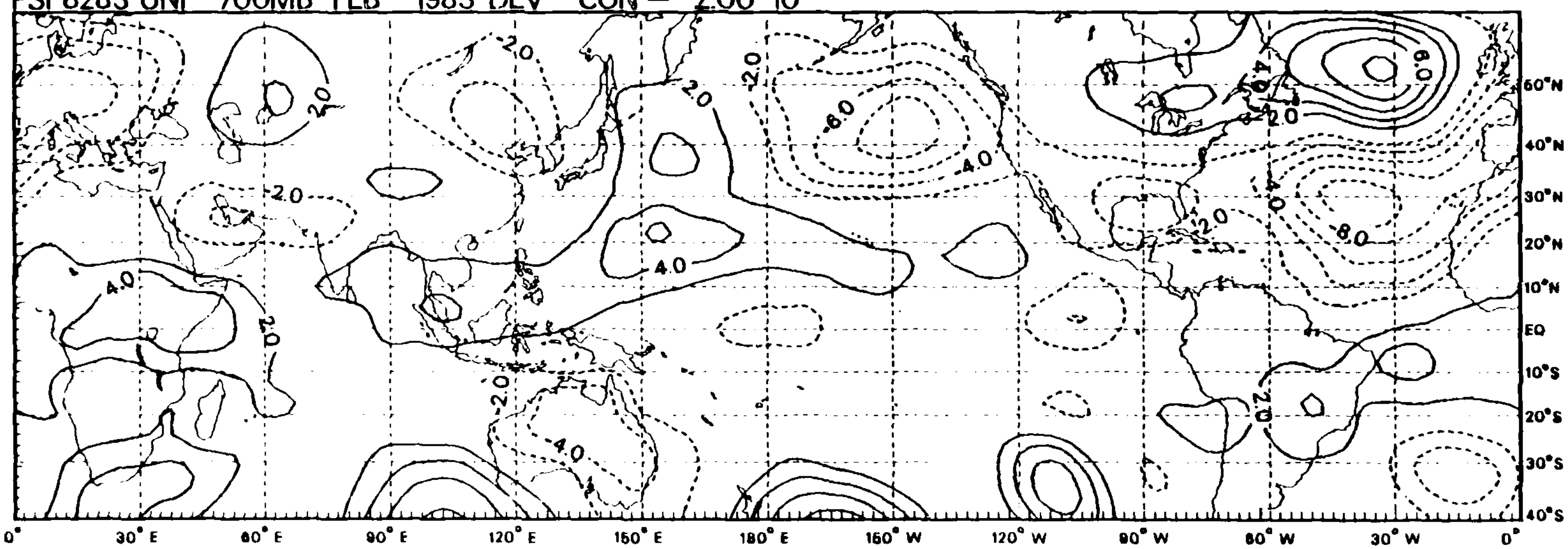
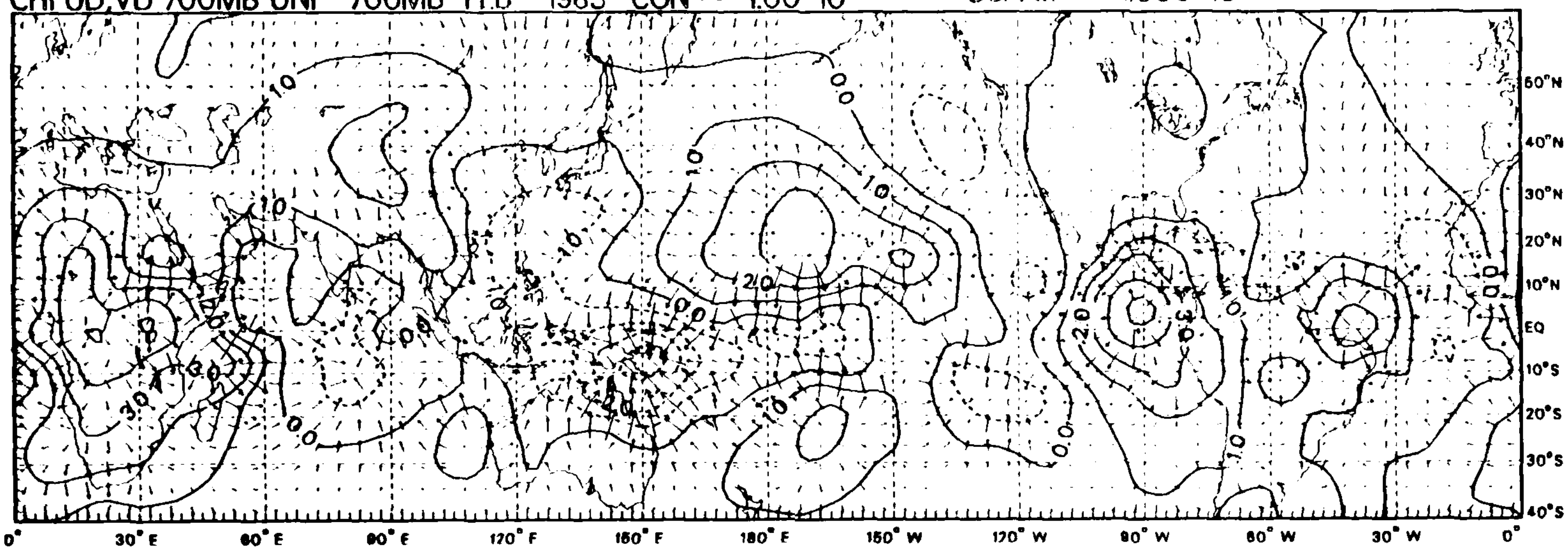
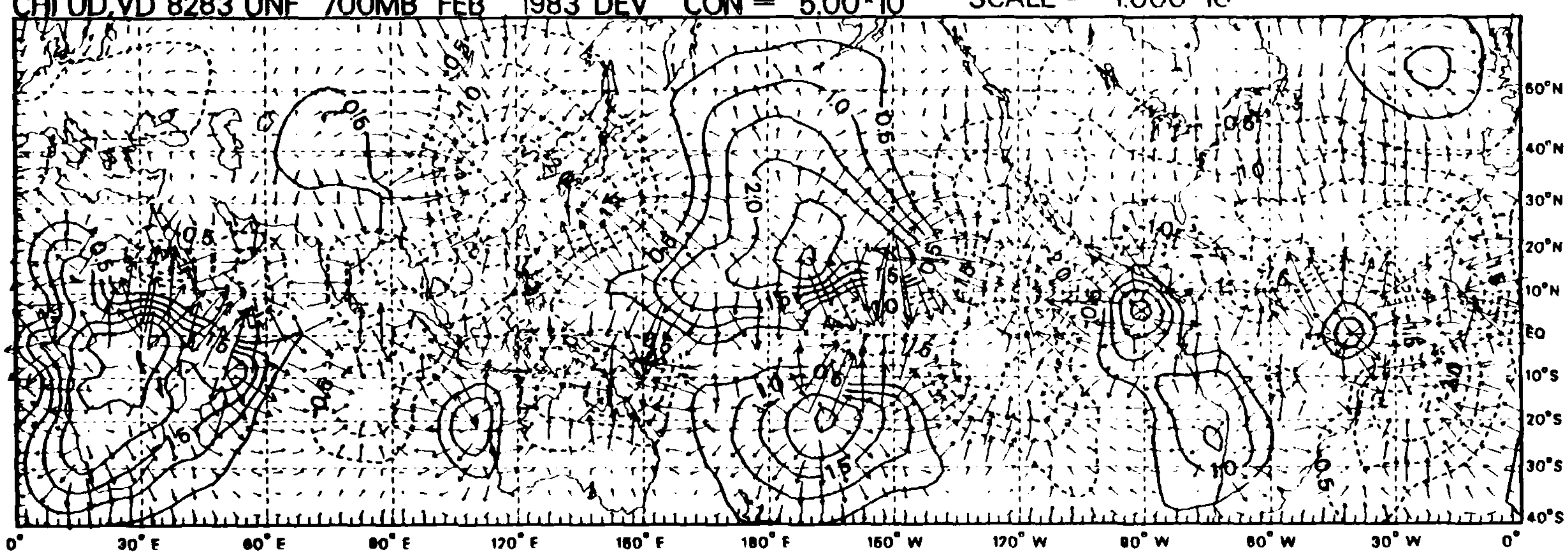


CHI UD,VD 700MB UNF 700MB FEB 1983 CON = 1.00*10$^{0}$ SCALE = 2.000*10$^{0}$




CHI UD,VD 8283 UNF 700MB FEB 1983 DEV CON = 5.00*10$^{-1}$ SCALE = 1.000*10$^{0}$



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